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**INFRASTRUCTURE INVESTMENT AT FLORIDA'S DEEP-WATER SEAPORTS
DOES INVESTMENT MEET THE NEEDS OF IMPROVED TRADE & CONTAINER TRAFFIC?**

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CHRISTOPHER LEE OWEN

REPORT

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ABSTRACT

INFRASTRUCTURE INVESTMENT AT FLORIDA'S DEEP-WATER SEAPORTS DOES INVESTMENT MEET THE NEEDS OF IMPROVED TRADE & CONTAINER TRAFFIC?

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THE UNIVERSITY OF TEXAS AT AUSTIN, 2017

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Continuous improvements are an important element of port operations, especially for Florida's three largest container ports along the Atlantic which handle 90% of all container trade in the state.¹ They are expanding capabilities to handle larger container ships with higher cargo loads as well as improve landside connection to distribution networks. PortMiami, Port Everglades (Fort Lauderdale) and JAXPort (Jacksonville) are in a race to capture more market share from containerized trade, predominantly with Asia. The bulk of that trade will continue to flow to West Coast ports because they are the most direct even though the majority of the U.S. population lives east of the Mississippi. Ports on the East Coast are engaged in growing as viable alternatives for carriers that want to avoid congestion issues on West Coast trade lanes. The capital investments in port improvement projects in Florida represent a fraction of the billions being spent at ports across the world, each trying to advance their standing in supply chains and be utilized more by carriers. The shipping industry is closely aligning how fast and at what cost cargo can be delivered with other supply chain strategies to improve reliability. Almost every major port in the U.S. is increasing capacity for larger ships to dock and concentrating development on improving the speed and efficiency of cargo handling including rail/truck links to transportation networks. Ports in Florida have the added complexity of competing not only with out-of-state ports, but against each other in-state.

This paper examines the factors behind why ports need to invest in increasing capacity. It focuses on 1) existing and planned improvements at PortMiami, Port Everglades and JAXPort to handle larger ships and increased cargo loads; 2) highlighting each port's standing in current supply chains and the challenges each face; and 3) ascertaining whether each port can grow physically to meet expanded levels of trade. I conclude the professional report with a recommendation that only one port in the state, JAXPort, is positioned with the best chance to capture market share from competing ports and become a more dominant regional player in container trade.

¹ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan," *Florida Ports Council*, April 2017.

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EXECUTIVE SUMMARY

INFRASTRUCTURE INVESTMENT AT FLORIDA'S THREE LARGEST DEEP-WATER SEAPORTS - DOES INVESTMENT MEET THE NEEDS OF IMPROVED TRADE & CONTAINER TRAFFIC?

Billions of dollars have been spent, and billions more are in the pipeline, on improvements at Florida's fifteen deep-water ports. Potentially, \$2.8 billion in capital improvements projects are proposed for the next five years. The political considerations in the process for how this money is allocated and agreed upon does not allow investment to be focused on one port that could have the best chance of capturing additional container traffic from competing out-of-state ports. Investments at ports are usually spread throughout the state to benefit local communities which does not contribute to the state's overall standing in international trade. Trends in shipping, from more efficient supply chains to ship sizes, dictate that ports, especially those on the East and Gulf Coasts need to invest in massive land and water enhancements to maintain relevance. The sizes of containerships as well as cruise ships are increasing. The larger ships and higher cargo loads place added stress at the ports and on inland transportation systems. This paper will focus on the steps that PortMiami, Port Everglades and JAXPort, are taking to improve their utilization in the container trade and the challenges each faces with achieving the goal of increased traffic.

Trade was one of the chief engines for economic growth in Florida. The state's tremendous population growth in the last half of the 20th century fueled the development of its transportation network. From 1970 through 1995, the population in Florida grew about 3.0% annually, pace that will slow over the next decade to 1.5% annually.² While the growth rate will decrease, many economists believe that international trade, particularly from Asian markets, will continue to rise. Exports from Asian economies for low-cost manufactured goods could slow under the U.S. administration's current and evolving protectionist policy, but the access to cheap goods produced in developing countries will continue to drive trade in many respects. The bulk of that trade will continue to flow via the direct route to West Coast ports but increasingly ports on the East Coast will be used more as a viable alternative for carriers that want to avoid congestion issues on West Coast trade lanes.

Waterborne trade is moving towards larger ships that provide more economies-of-scale and cost efficiencies. Many ports along the Atlantic, including those in Florida, are not equipped to handle these larger ships. Some ports are already well established on supply chains and have

² Moody's Analytics, 2017.

capabilities to accept larger ships, including ports in Savannah, Norfolk and New York/New Jersey. These have been considered traditional hubs that process cargo to inland markets as well as transfer points to process cargo for other ports throughout the eastern U.S, including the bulk of international cargo that travels to other markets with ports via truck or rail. The increases in ship sizes and potential for higher trade flows forced the necessity for Florida's ports to increase capacity to stay competitive against its competitors.

Traditionally, trade from Asia went first to West Coast ports and then was shipped overland to East Coast markets. West Coast ports had deeper depths and huge facilities to handle the largest sized ships. As international trade expanded in the last half of the 20th century, ports on the West Coast developed a near monopoly on container trade with Asia. Over the last two decades, carriers sought to expand the number of alternative routes to U.S. markets from Asia because of cost concerns and uncertainties at West Coast ports. The two biggest limitations to growing Asian trade directly to the East Coast were restrictions imposed on the size of ships using the Panama Canal and the limited number of ports on the East Coast that could handle larger containerships efficiently. The first issue has been addressed with the expanded capabilities through the Panama Canal and the second with the ongoing capacity upgrades at ports along the East Coast.

Besides increasing traffic from international trade, ports in Florida are also hoping to capture more container traffic from out-of-state ports for goods that are ultimately consumed in the state. Many times, containers that arrive at these ports are either loaded onto other ships that stop off at Florida ports or, in most cases, shipped overland by truck or rail. There is a huge incentive for Florida ports to want to capture more of these containers. For every container that comes through Florida ports, it helps to create new jobs and increase local taxes. Containers would come directly to Florida instead of being routed through other ports first. To be successful, it means that Florida will need to change its position in existing supply chains from Asia. Supply chains are logistics network of "interrelated organizations, resources, and processes that create and deliver products and services to customers from interconnected markets around the world."³ They are how goods move from point A to point B as well as a system that tracks the different components through the production process to assembly and then transportation network to end customers. They are not linear but almost three dimensional, with different modes of transport, intersecting origins for inputs and overlapping markets for end customers. The designers focus on reducing the time and cost involved with moving different components and finished goods. By increasing port capacity at the three largest container ports to the Panama Canal, Florida could potentially position itself as a quicker, lower cost alternative than larger, more congested ports farther north.

³ Al Nahla, Ghada. 2012. "Global Supply Chain." Accessed April 15, 2017 at <https://www.slideshare.net/GhadaAlNahla/global-supply-chain-12538114>. Page 2.

How can ports, especially those in Florida, be better utilized in global supply chains? “Ports that are not able to allow ocean carriers to bring in larger ships risk being kept off service loops that favor ports that can.”⁴ Those service loops, including transshipment hubs, are key to supply chains which look to efficiently move cargo. Ports that can combine speed-of-delivery with lower costs will stay competitive and also be able to capture market share from other ports. For Florida’s three main container ports, the race to expand capacity and compete directly with other ports are the driving forces behind the extensive capital projects at most ports. PortMiami has mostly completed the majority of its infrastructure improvements. Port Everglades and JAXPort are in the beginning stages on projects that will deepen channels and improve ship to shore connections for cargo. PortMiami, Port Everglades and JaxPort all have clear advantages and disadvantages in the current supply chains and will continue to do so even after major upgrades are complete. Each will have the ability to improve and capture more container traffic. In this professional report, I argue that only one, JAXPort, will have the ability to expand port infrastructure, speed the transfer of cargo to transportation systems and have the potential to capture more market share from out-of-state ports.

⁴ Hutchins, Reynolds. "US Port Deepening Fight Intensifies on Funding Worries." JOC.com | Journal of Commerce. January 31, 2017. Accessed June 18, 2017.

1.0 INTRODUCTION OF TOPIC

1.1 Statement of Purpose

Florida embarked on a massive enhancement program over the last twenty years at its largest container ports to maintain their relevancy in existing trade flows and improve their capacity to handle increased amounts of cargo. Trade has always been one of the state's economic lifelines. Its geographic location and 1,350 miles of coastline made its ports important points in how goods came and left the state. How best to exploit the state's logistical advantage on international trade flows and raise the level of trade was hampered by the sheer number of deep-water ports along its coastline and limited export capabilities. Furthermore, industry trends and political considerations dictated that a wide approach to the allocation of funds for investment would be needed to satisfy stakeholders at the local and state levels. By not targeting investment in one or two ports that have the best chance to make the largest economic impact for the state, there remained the potential to miss out on capturing additional increases in trade.

Florida ranked among the top 10 states in the U.S. for international trade and it was the 10th busiest importing state and the seventh busiest exporting state in the nation.⁵ Cultural ties "provided increasing opportunities for trade with economies of the Southern Hemisphere, and a growing regional population supported a steady stream of consumer goods moving into Florida."⁶ The state's importance as a consumer market and gateway for trade between the United States (U.S.), Asia, Caribbean, Central and South American grew as Florida's economy took off since the 1950s. From a trade perspective, Florida will only grow since it is at the crossroads of growing north-south and east-west trade lanes, which will have access to more than 1.1 billion consumers in the Western Hemisphere by 2035.⁷

Trade grew because it got easier and cheaper to move goods with the introduction of containers. These 20 by 40 foot metal boxes created an easy way to store and transport goods. Ships and cargo handling procedures could be standardized across the industry. It created huge cost and labor savings. The introduction of large container ships in the 1950s allowed for even more advances in speed and efficiencies. These larger ships could carry more cargo and create more economies-of-scale. It also led to the development of supply chains to efficiently track and deliver cargo across markets. Carriers could now pinpoint where goods came from, where they needed to go and plan accordingly. They could pick the size of ship, the port and the amount of time it should take for delivery. The strategic component in this analysis was the fact that not all ships could dock

⁵ "Florida's Seaports – A Global Threshold 2016-2020, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2016.

⁶ Luttrell, Bill. "Freight Corridors & Logistics Hub Shape the Location Decision." *Area Development*. May 5, 2015. Accessed May 07, 2017. www.areadevelopment.com.

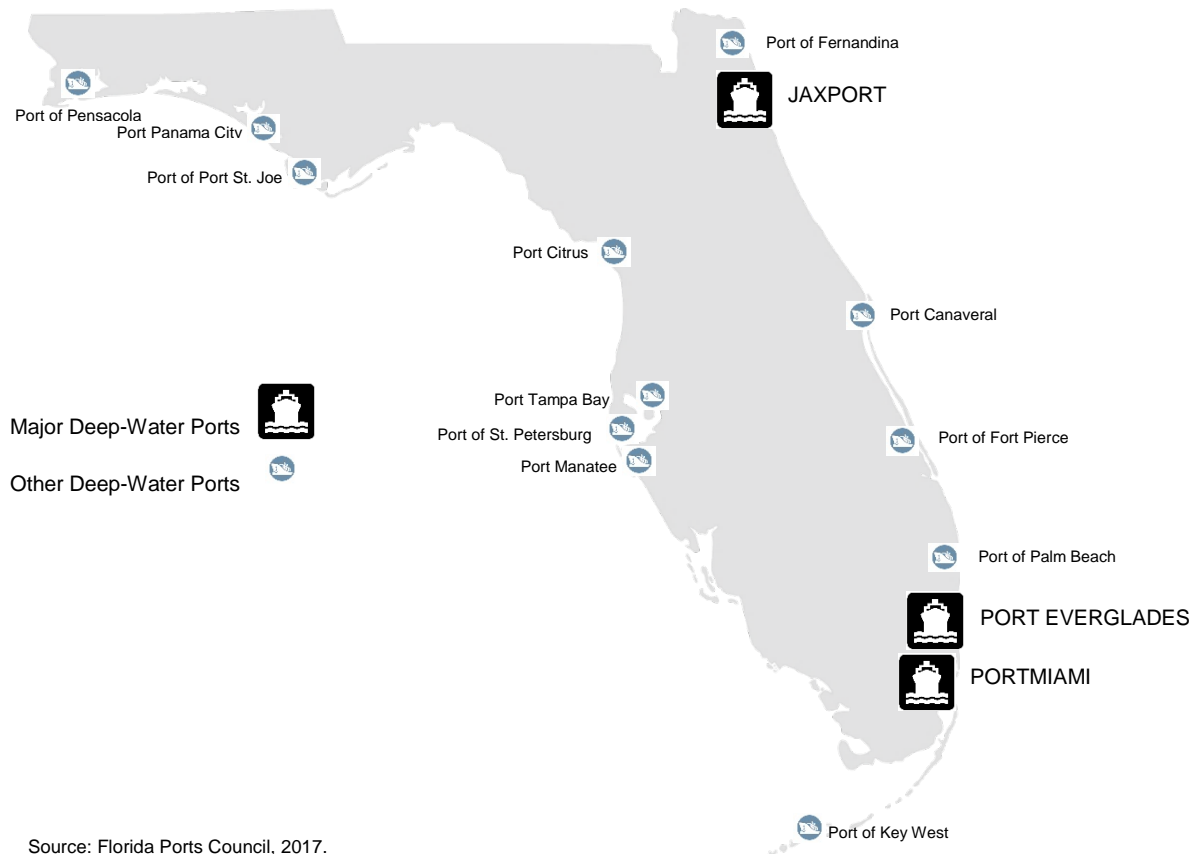
⁷ "Florida Trade & Logistics Study." *Florida Chamber Foundation and Florida Department of Transportation*, Cambridge Systems, February 2011.

at all ports and the direct route sometimes might not be the most optimal because of speed and cost concerns.

Traditional delivery models in supply chains from Asia predominantly used the direct route to West Coast ports with limited direct trade to the East Coast. By the last 1980s, containership sizes had already outgrown the size of the locks in the Panama Canal. Starting in the early 2000s, two circumstances occurred that shifted the focus to enhancing direct trade with the East and Gulf Coasts. First, in 2002/2003 was the union issues at West Coast ports that led many carriers to seek to create alternative supply chains that were less congested, more reliable and service more customers directly than ports on the West Coast. The second was the start of construction to expand the Panama Canal in 2007. This was going to allow larger containerships to dock directly at East Coast ports. These developments set off a chain reaction over the next decade since most East Coast ports did not have the capacity to accept larger ships, process increased amounts of cargo or have adequate inland transportation links to end markets.

Historically, Florida ports were frequently bypassed by containerships plying the Eastern Seaboard. The clear advantage that Florida enjoys due to its location as the closest U.S. ports to the Panama Canal were tempered by the lack of a strong manufacturing or export base. Most Florida's ports did not have the balance between imports and exports that carriers wanted. The more equilibrium a port had, the more appealing the port. It costs the same to transport an empty as it is a full one. Moreover, larger ports along the East Coast had established themselves as key components in existing supply chains based on better port infrastructure and transportation links to end markets. They also had significant export capabilities. Ports in Florida were hard pressed to capture business from these competitors. Over the last fifteen years, the new push by carriers for alternative entry points coupled with the canal's expansion created a new dynamic and incentive at Florida ports to push through substantial capital improvements.

Map 1: Florida Deep-Water Ports



Source: Florida Ports Council, 2017.

While container traffic is focused on three ports along the Atlantic, PortMiami, Port Everglades and JAXPORT, it represents less than a quarter of all waterborne trade. The diversity of Florida's ports allow for many delivery options for carriers to efficiently and quickly "ensure that the right product is delivered at the right time in the right condition to the right customer in the right place at the right price."⁸ The logistics of moving goods through the market produces a huge benefit to the state and local communities. Ports in Florida support nearly 900,000 direct or indirect job, produce 14.5% of the state's total economic activity, or \$117.6 billion, and produce roughly \$4.2 billion, or 10% of all local and state tax revenues.⁹ In fact, ports are a job and tax revenue source, many times the largest economic driver in communities. That adds the political aspect to the allocation of resources to individual ports. It is estimated that every \$1.00 invested in the ports yields \$6.90 to the state economy.¹⁰ Local elected officials with ports are incentivized to pursue

⁸ Global Supply Chain Intelligence. (<http://www.gscintell.com/faq/>). Accessed June 20, 2017.

⁹ World City. Trade Numbers. (<https://www.ustradenumbers.com/>). Accessed April 16, 2017.

¹⁰ "Florida Transportation Trends and Conditions – Travel Demand: Trade & Freight Transportation Demand." *Florida Department of Transportation. Office of Policy Planning*. July 2012.

infrastructure investment to ensure that new jobs are created and the tax base grows in their districts. Each job in Florida's trade and logistics cluster supports about two other jobs in the state's economy.¹¹ Investment at ports have a huge impact on the state's economy. The large number of ports also means that local politicians with competing interests vie for the same resources from the state and federal government. Instead of focusing efforts on one port to address the overall state's limitations, money is set aside to incrementally make changes at the maximum number of ports to spread the economic benefits across the state.

Table 1: Types of Cargo

Bulk	Commodity cargo that is transported unpackaged in large quantities. These cargos are usually dropped as a solid into a bulk carrier's hold. Examples of bulk cargo are grain, coal and iron ore.
Liquid	Commodity cargo that is in liquid form that is usually poured into a bulk carrier's hold or individual container. In Florida, the predominant liquid cargo is petroleum product shipped in barrels.
Break Bulk	Loose cargo, such as cartons, stowed directly in the ships hold as opposed to containerized or bulk cargo. The volume of break bulk cargo has declined dramatically worldwide as container traffic has grown.
Container	A reusable steel rectangular box, with the standard size for international shipping 20 feet by 40 feet. Allows for easy transfer between different modes of transport (ships, rail or truck).

Cargo coming into the state can be broken down into four main categories (see Table 1 above and Graph 1 below). Container traffic houses any products that can be stored in steel boxes. Bulk and break bulk cargo is usually loose or bagged and include commodities and some processed goods like cement and flour. A type of bulk cargo is roll-on/roll off, which includes wheeled pieces, typically automobiles and heavy machinery. Liquid cargo includes petroleum and petroleum products. Of Florida's fifteen (15) ports, "nine handled dry bulk, eight handled liquid bulk, eleven handled break bulk and ten handled container cargo. Seven ports handled all four cargo types."¹² PortMiami, Port Everglades and JAXPort handle 90% of all container traffic.

¹¹ "Florida Trade & Logistics Study." *Florida Chamber Foundation and Florida Department of Transportation*, Cambridge Systems, February 2011.

¹² "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan," *Florida Ports Council*, April 2017.

Table 2: Waterborne Cargo Types Handled by Florida Seaports (By Tonnage) 2015/2016

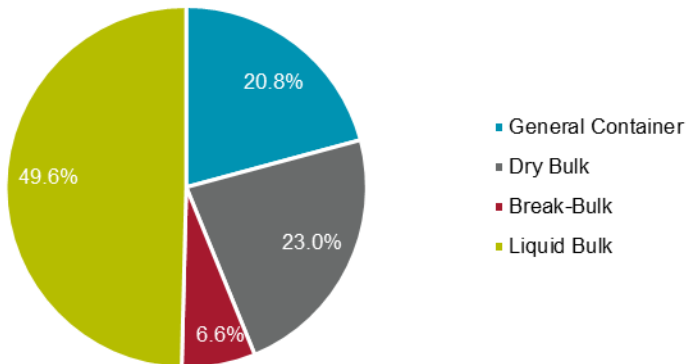
	Dry Bulk	Liquid Bulk	Break-Bulk	Container	Total
Canaveral	1,531,262	3,845,853	119,913	27,450	5,524,478
Everglades	1,428,763	16,223,101	336,777	6,692,690	24,681,331
Fernandina	21,851	-	238,004	37,019	296,874
Fort Pierce	-	30,000	26,600	-	56,600
Jacksonville	5,507,502	4,745,131	4,103,357	4,661,804	19,017,794
Manatee	807,352	5,290,549	529,762	261,094	6,888,757
Miami	-	-	6,348	8,771,626	8,777,974
Palm Beach	783,690	304,152	135,923	1,295,490	2,519,255
Panama City	856,038	22,144	832,086	170,133	1,880,401
Pensacola	132,032	-	68,898	79	201,009
Tampa	13,618,585	22,821,560	645,508	439,800	37,525,453
Total 2015/16	24,687,075	53,282,490	7,043,176	22,357,185	107,369,926
Total 2014/15	24,254,635	50,376,613	6,889,987	21,490,826	103,012,061
Tonnage Change	432,440	2,905,877	153,189	866,359	4,357,865
Percent Change	1.8%	5.8%	2.2%	4.0%	4.2%

Source: Florida Ports Council, 2017/2021. No cargo handled at the following ports; Citrus, Key West, St. Joe and St. Petersburg.

Florida's challenge has always been in figuring out where it fits into overall supply chains. Global supply chain management is "a business strategy to improve value by optimizing the flow of products, services and related information from source to customer. It encompasses the processes of creating and fulfilling the market's demand for goods and services."¹³ Container traffic either come into Florida via the ports or shipped overland from out-of-state ports. Supply chains are a complicated, multi-structured non-linear way that trade moves. The reason why half of the containers that come into Florida overland is that carriers have determined that it is cheaper and more efficient then using ports in-state. Florida's three container ports are forced to invest and increase capacity so that they came at least maintain their current standing in existing supply chains. If they do not, they have the potential to lose out to competing ports that are improving capabilities. They also want to capture more container cargo directly that is being processed at other ports out-of-state. Not every port in Florida is positioned to do both.

¹³ Global Supply Chain Intelligence, (<http://www.gscintell.com/faq/>), accessed June 20, 1997.

Graph 1: Percentage Waterborne Cargo Types at Florida Seaports FY 2015/2016 (by tonnage)



Source: Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan, April 2017, Florida Ports Council.

1.2 Objectives

The main question that is being addressed in this report is to determine which of Florida's top three deep-water ports, PortMiami, Port Everglades and JAXPort, have the ability to capture additional market share from other ports based on increased capacity. Each port has clear advantages and disadvantages. PortMiami has already embarked on extensive improvements to deepen channels and improve port connections with the overall transportation network. Port Everglades and JAXPort are moving forward with plans to allow them to accept larger ships and further develop landside transportation efficiencies. Each are creating the infrastructure to make their ports competitive with other ports along the East Coast as well as against each other. In the end, billions will be spent and the investments will have long-term consequences on Florida's role in international trade and in global supply chains.

There are different ways to measure success at the ports. Increased capacity in terms of the number of containers processed is one part of the equation. Another one tracks the efficiency in handling cargo from ships and how quickly goods are moved through the transportation networks. A third point focuses on the inbound and outbound balances for cargo at a port. If all three are optimized, then the port would could handle larger container ships, quickly move cargo through the port to end markets and allow carriers to replace any empty containers with full ones when they dock.

The ports in Florida do not rank high with all of the measures listed above. Florida is chasing capacity at its deep-water ports to make them more attractive in supply chains. Part of the decision process probably involves a "build it and they will come" mentality, meaning that there is a potential to capture more market share if capacity is increased. If it is not increased, Florida ports could become irrelevant. Even with the higher capabilities at Florida ports, other adjustments to

trade flows would have to occur to significantly change current market dynamics.

The main areas covered in this report will detail specific advantages and disadvantages at each of the three Florida ports and include:

- Port Infrastructure: Includes channel width, turning basin, length of channel, number of berths, length of berth, number and size of cranes to transfer cargo to and from a ship, and port cargo and warehouse space/yards to meet short term needs before goods are either moved through the port to the transportation network or are loaded onto ships for export.
- Inbound/Outbound Equilibrium: Ideally, carriers look for ports that allow them to replace any inbound cargo with the same amount of outbound cargo thereby reducing overall shipping costs since ships are not transporting empty containers between ports.
- Landside Warehouse/Distribution Market: Inbound cargo into a port is either consumed in that market or passes through it to other markets. The ability to process cargo is not usually done at the port but in landside facilities adjacent to the port.

This report will try to understand how the capital improvements proposed or completed, will help analyze to increase container traffic and whether each port is capable of handling and moving cargo through its facilities efficiently. The biggest challenge for the three largest ports, PortMiami, Port Everglades and JAXPort, will be to align expansion plans to accommodate bigger ships with their ability to quickly and efficiently shift containers off ships and ultimately to end customers.

1.3 Methodology

I presented my initial hypothesis based on my experience working throughout Florida covering the industrial real estate market. My background in commercial real estate formed the core of my argument that only one port, JAXPort, makes the logical sense. The purpose of this paper was to justify the premise that JAXPort has clear advantages and is better positioned to capture more market share from competing out-of-state ports than either PortMiami or Port Everglades. I conducted, when possible, direct interviews with key stakeholders or influencers. I reviewed numerous research and financial reports from the ports, working papers from government and quasi-government entities, trade groups and industry-related websites.

When I initiated this process, I was immediately confronted with a magnitude of information on port development, trade flows and the shipping industry. I was challenged in how to present the main points of my paper without getting lost in important, but ultimately tangential details about the topic. Many of these are worthy but not necessary to highlight my conclusions. The large number of variables involved in international trade and port development forced me to make choices and to focus only on certain market-specific areas that showed broadly the overall issues facing Florida ports. I was initially going to emphasize the real estate aspect to port development. There were clear cut land limitations at some ports to expand based on potential growth in traffic. I thought this could be the basis for my argument as to which is the optimal port in Florida for further investment. I quickly discovered that to make my case I needed to expand my due diligence to include an analysis on supply chains and an overview of the shipping sector since they were bigger determinants on a port's importance.

There areas regarding port development that were not fully addressed in the report are in how investment decisions are made and in the employment effect. There is a brief overview of the political aspect of resource allocation but the purpose of this paper is to highlight which port the state should focus on for infrastructure improvements to increase capacity. It is not to hash out why the state is spreading investment throughout each of its fifteen ports. It is self-evident that stakeholders from local markets with ports would do everything in their power to steer money to their local jurisdictions. The economic development potential and number of jobs at stake create a strong incentive for politicians to get their slice of the resource pie. It is the same reason why the employment angle on direct and indirect jobs supported by port operations was not included in this report.

The largest obstacle in my due diligence process was when to cut off the information spigot. The amount of data from numerous sources, both local, national and anecdotal made it easy at times to lose sight of the main point of the report. I also confronted shifting interpretations in how data was used to prove the viability of one port compared to others. An example would be how

different ports would interpret the same set of data to highlight advantages or disadvantages. Moreover, new information, studies and reports were published almost on a daily basis, any of which could affect the validity of my conclusions. At some point I had to work with the intelligence gathered and hope that new information would not materially affect the conclusions in the final report.

1.4 Significance

The need for Florida's three main container ports, JAXPort, Port Everglades and Port Miami, to increase capacity is based on rapid changes within the shipping industry. The shift to larger ships and increased loads means that ports that do not upgrade have the potential to lose out being utilized more in supply chains. The purpose of this report is to look at Florida's three main container ports and determine which one can build the infrastructure that has the best chance of capturing more container trade market share from competing out-of-state ports. Since the ability of a port to handle larger ships and increased loads are only two factors among many in its attractiveness to carriers, other variables need to be addressed to make one, or possibly two, ports in Florida greater players for international container trade.

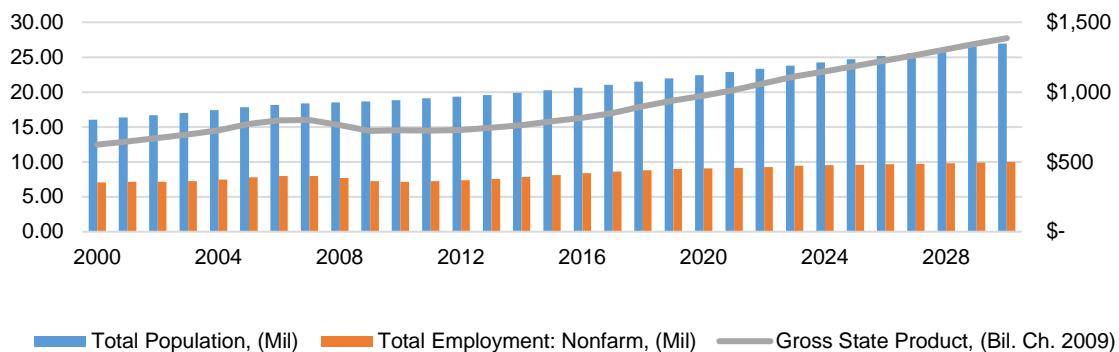
The important point this paper is making is that there are clear advantages to some ports over others to capture more container traffic. What I am trying to highlight and which is not fully discussed in recent literature on the topic, is that capacity increases and better cargo handling techniques will not make South Florida ports more attractive than JAXPort for container traffic. The simple fact is that the Jacksonville market has better transportation linkages via rail and highway to other markets in Florida and throughout the Southeast. JAXPort also has a better chance at capturing more Florida-bound containers from out-of-state ports. From the perspective of the warehouse/distribution market, Jacksonville provides the lower cost alternative based on current asking rents which are less by half than those in Broward or Miami-Dade counties. The purpose of this paper is not to indicate that the investment at PortMiami or Port Everglades are not needed for them to remain competitive. It is to show that the money spent on capital improvements may not necessarily lead to more container trade since there are other factors which are stacked against them. In an ideal scenario, public and private sources would be focused on improving Florida's overall economic competitiveness against other markets. Florida, with its multiple population clusters and plethora of port facilities, makes it hard to focus investment on one port or one area.

2.0 BACKGROUND ON DEVELOPMENT

Increases in Port Capacity Chasing Expected Demand

The importance of trade and the development of its seaports is directly tied to Florida's explosive population growth. Florida is now the third most populous state in the nation, behind California and Texas, with over 20.1 million people at the end of 2016.¹⁴ It is the largest state by land area east of the Mississippi and the 8th most densely populated with 355 people per square mile.¹⁵ Most of Florida's density is on the peninsula with the counties along the panhandle the least populated. Florida's growing consumer power is best represented by its economic output. "The current-dollar gross state product (GSP) was \$926.8 billion, which ranks it 4th in the United States."¹⁶ "GSP is a measurement of a state's output; it is the sum of value added from all industries in the state. Current dollar GSP components are compensation of employees, taxes on production and imports, and gross-operating surplus."¹⁷

Graph 2: Florida Demand Forecast



* Moody's Analytics, 2016. U.S. Census Bureau data. Gross Product is Gross State Product.

Florida has come a long way from the sleepy agricultural-based economy of the 19th and early 20th centuries when the state was known for its cattle farming, sugarcane, citrus, and other crops. Trade and tourism played an integral part in the state's development. After the Civil War, private investors from the north built several rail lines that connected Florida's markets to those outside of the state. With the advent of rail, tourism took hold letting northerners travel easily to coastal areas in the South. At this time domestic trade through area ports increased and new raw

¹⁴ Moody's Analytics, 2017.

¹⁵ Moody's Analytics, 2017.

¹⁶ U.S. Bureau of Economic Analysis. "U.S. Department of Commerce, Personal Income – Florida." March 28, 2017. Page 2.

¹⁷ "State Health Facts." The Henry J. Kaiser Family Foundation. Accessed July 10, 2017, <http://www.kff.org/other/state-indicator/total-gross-state-product/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

materials and commodities in Florida started to be exported out of state.

After World War II ended, Florida embarked on a sustained period of growth. From 1950 through 2016, Florida's population grew by 626%, from 2.8 million to 20.1 million. "At the highest estimate, Florida's population is projected to increase by 6 million people by 2030."¹⁸ Two-thirds of that growth will occur in just 15 of the 67 counties in Florida with more than half of the expected population increases in the ten counties that are all serviced by either major rail and/or deep-water port facilities.

Graph 3: Seven Largest Counties by Population 2030



* University of Florida's Bureau of Economic & Business Research Projections, Florida Population by County 2015-2030.

2.1 State Demographic Analysis

Florida's population is aging. The percent of people over the age of 65 was 17.5% in 2000. By 2016, that number jumped to 19.0%. The median age increased from 38.8 in 2000 to 41.6 in 2016 and will jump to 42.4 in the next five years. Older generations (age 65 and older) will account for the most gains from 2016 to 2021, representing 768,431 new residents. Over the same period, the number of new residents 19 year and under was only expected to grow by 2.7% or 120, 951 new residents.¹⁹

Table 3: Population by Age

	2000 Census		2016A Estimates		2021 Projections		Percent Change	
							2000/2010	2016/2021
0 to 4	937,875	5.9%	1,073,507	5.5%	1,099,219	5.4%	14.5%	4.9%
5 to 14	2,092,026	13.1%	2,294,255	11.4%	2,360,402	11.0%	5.7%	2.9%
15 to 19	994,374	6.2%	1,188,585	5.9%	1,217,677	5.7%	23.5%	2.4%
20 to 24	924,734	5.8%	1,335,809	6.6%	1,319,115	6.1%	32.9%	-1.2%
25 to 34	2,061,742	12.9%	2,560,685	12.7%	2,781,295	12.9%	11.0%	8.6%
35 to 44	2,535,108	15.9%	2,456,417	12.2%	2,605,571	12.1%	-4.1%	6.1%
45 to 54	2,061,040	12.9%	2,776,770	13.8%	2,680,846	12.5%	33.0%	-3.5%
55 to 64	1,553,286	9.7%	2,600,594	12.9%	2,783,230	12.9%	50.5%	7.0%
65 to 85+	2,807,432	17.5%	3,823,199	19.0%	4,591,630	21.4%	58.8%	53.6%

* Alteryx, Inc. 2017 (www.alteryx.com).

¹⁸ Florida Chamber of Commerce. "Did You know that Florida's Population Could Increase to Nearly 26 Million by 2030?" (<http://www.flchamber.com/did-you-know-that-floridas-population-could-increase-to-nearly-26-million-by-2030/>). Accessed on May 7, 2017.

¹⁹ Alteryx, Inc. 2017 (www.alteryx.com).

The state is also getting more diverse. The portion of the population in Florida that identified as Hispanic or Latino jumped 7.7 percentage points from 2000 to 2016. Florida ranks as the sixth state with the highest proportion of Hispanic residents and the only state in the Southeast. In fact, every demographic group in Florida besides white gained share since the turn of the century. The Not Hispanic or Latino portion of the population fell from 83.2% in 2000 to 75.5% by the end of 2016. By 2021, there will be 5.6 million people of Hispanic descent living in Florida, over a quarter of the total population.²⁰

Table 4: Population by Ethnicity

Ethnicity	2000 Census		2016A Estimates		2021 Projections		2016/2021
Hispanic	2,679,501	16.8%	4,926,742	24.5%	5,565,330	25.9%	13.0%
Not Hispanic or Latino	13,288,115	83.2%	15,208,792	75.5%	15,926,988	74.1%	4.7%

* Alteryx, Inc. 2017 (www.alteryx.com).

A third significant demographic trend which to highlight is the growth in household income. Table 4 below, shows that in the last 17 years, the median household income rose by \$9,300 and per capita income rose by \$6,560. More important to trade and increasing consumer buying power, the number of households making over \$75,000 annually rose by 10.4 percentage points, or almost 1.8 million households.

Table 5: Household Income

	2000 Census		2016A Estimates		2021 Projections		Percent Change	
							2000/2010	2016/2021
\$0 - \$15,000	1,033,088	16.3%	1,055,299	13.3%	915,009	10.8%	-6.4%	-13.3%
\$15,000 - \$24,999	917,597	14.5%	944,892	11.9%	875,166	10.3%	1.8%	-7.4%
\$25,000 - \$34,999	900,626	14.2%	906,522	11.5%	853,658	10.1%	0.8%	-5.8%
\$35,000 - \$49,999	1,102,516	17.4%	1,175,106	14.9%	1,127,797	13.3%	5.5%	-4.0%
\$50,000 - \$74,999	1,169,265	18.5%	1,495,337	18.9%	1,615,312	19.0%	16.5%	8.0%
\$75,000 - \$99,999	551,558	8.7%	894,031	11.3%	1,102,979	13.0%	51.2%	23.4%
\$100,000 - \$149,999	398,068	6.3%	853,594	10.8%	1,191,370	14.0%	92.8%	39.6%
\$150,000 +	260,837	4.1%	588,314	7.4%	802,787	9.5%	86.0%	36.5%
Average Hhld Income	\$53,493		\$69,879		\$80,973		26.6%	15.9%
Median Hhld Income	\$38,913		\$48,187		\$57,087		18.6%	18.5%
Per Capita Income	\$21,207		\$27,764		\$32,249		27.5%	16.2%

Source: Alteryx, Inc. 2017 (www.alteryx.com). Hhld represents household.

Florida's economy is clearly benefitting from the influx of new residents and population growth. The larger number of consumers in the market will have clear implications on trade patterns. Having a growing population provides an incentive for carriers to view ports in Florida as

²⁰ Alteryx, Inc. 2017 (www.alteryx.com).

viable conduits to growing customer bases. The expanding demographics in the state provide one more incentive for carriers to potentially shift operations through Florida ports away from out-of-state competitors since carriers in are always looking to develop the most cost-efficient methods to service markets and customers.

2.2 Global Supply Chains

One of the most important aspects to understand when talking about Florida ports is to understand where they fit within global supply chains. Supply chains involve coordinating and integrating the flows of good and manufactured products both among companies and end customers. Supply chains are not only linear but multi-dimensional and overlap markets and international boundaries. Florida's ports handled 6.6% of US global waterborne export trade in 2016 and over 25% of U.S. waterborne export trade with South/Central America and the Caribbean.²¹ The state got to that point by trade liberalization policies that were made easier by advances in transport and communication technologies that "increased the speed and efficiency of transport and lowered the costs of communication."²² As a result, operators in logistics can, "at a keystroke, scan the world commodity and product markets and select routes, methods of shipment and carriers in such a manner that ensures quality, expediency and reliability while at the same time optimizing generalized costs."²³ The Internet and global positioning systems (GPS) allows the industry to pinpoint and manage cargo in real time, as well as to adopt flexible *Just-in-Time* and *Make-to-Order* production technologies. These enabled global companies "to cope with the unpredictability of the seasonal business and trade cycles and plan business development with more certainty."²⁴ Just-in-time inventory management means getting the right goods get to the right customers at the right time with minimal storage costs or time delays. Make-to-Order is a lean manufacturing process in which the production of a product does not start until after a customer's order is received. Both are hallmarks of today's supply chains.

The increase in trade and the development of supply chains were further made possible by the containerization of cargo starting in the 1950s. Standard-sized cargo containers revolutionized the shipping industry. Prior to the use of containers, cargo-handling methods at ports were time-consuming, inefficient and required a significant amount of man power. Ships spent most of their time at ports waiting to load or unload cargo and not in transit. Ships at this time were built to carry unpackaged bulk cargo, such as grain, coal, ore and oil in cargo holds, not manufactured products or production components. Containers changed the whole viability of trade by sea. They allowed shipments to be scaled and compartmentalized depending on need and cut down on time ships had to be in port, overall costs to process and enabled better tracking.

There are two main types of containers for trade, domestic and international. Most domestic containers range from 40 to 53 feet, which can either be transported by rail or truck.

²¹ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017.

²² Haralamides, H. Marit. *Economic Logistics* (2017) 19:1. doi:10.1057/s41278-017-0068-6.

²³ Haralamides, H. Marit. *Economic Logistics* (2017) 19:1. doi:10.1057/s41278-017-0068-6.

²⁴ Haralamides, H. Marit. *Economic Logistics* (2017) 19:1. doi:10.1057/s41278-017-0068-6.

Containers used in international shipping are either 20 feet or 40 feet long. These types of containers are often expressed in twenty-foot equivalent units (TEUs). A twenty-foot equivalent unit is a measure of containerized cargo capacity equal to one standard 20-foot while two TEUs are the equivalent to one forty-foot container.²⁵ In addition, TEUs intensified the importance of increasing transportation links to end customers. Now that ports became one of the essential drivers for trade, as compared to traditional rail or highway systems, connections from ports to inland intermodal facilities became critical. "Intermodalism is a system whereby standard-sized TEUs (going forward TEUs will be used instead of containers in the report) can be moved seamlessly between different modes of transport, typically from specially adapted ships, barges, trucks and trains."²⁶ It is a system that connects transportation hubs, warehouses and distribution centers with markets. Facilities to transfer cargo could either be at the port or farther inland closer to rail and interstate connections.

"Port efficiency and productivity have thus been the main drivers behind the increase in containership sizes."²⁷ They allowed for increased cost savings and economies-of-scale which fed into higher levels of trade. As ships could handle more cargo and TEUs, most ports could not accept larger ships. Larger ports on the East Coast with infrastructure already in place would benefit the most from increased trade through the port, including the ports in New Jersey, New York and Norfolk. The trend to larger ships became one reason smaller ports had the incentive to upgrade and expand their capabilities. It was inevitable that the investment would have to be made. Currently, half of the container vessels being built around the world exceed 8,000 TEUs, requiring a channel depth over 50 feet under full load (versus only 7% of ships today requiring that depth).²⁸

There are defined reasons why ports needed to expand capabilities. Florida's ports must go deeper in order to stay in the game. Larger depths provide important logistics costs advantages for shippers as well as a job generator at the ports. Another plus is that since the trend is for bigger ships, deeper depths at some ports will make them more attractive to shippers. Carriers do not travel from point A to point B in a supply chain. Cargo is carried from multiple ports, loaded off and on depending on where the end customers are located before returning to international markets. It is a game of optimizing the transfer of goods between ships, intermodal facilities, rail, trucks, distribution centers and end customers. Each subsequent generation of containership is facing a shrinking number of harbors able to handle them. Even at the ports that can handle the larger ships, there is a huge amount of pressure on port infrastructure that is created when each ship that docks has to process over 8,000 TEUs. Even with increased depth at two or its three major ports will be

²⁵ Dedola Global Logistics. (<https://dedola.com/2011/10/what-is-a-teu/>). Accessed May 3, 2017.

²⁶ World Shipping Council, Glossary of Terms. (<http://www.worldshipping.org/about-the-industry/glossary-of-industry-terms>). Accessed June 20, 2017.

²⁷ Haralamides, H. Marit. *Economic Logistics* (2017) 19:1. doi:10.1057/s41278-017-0068-6.

²⁸ "State of Florida's Seaports 2015, Competitive Committed Connected." *Florida Ports Council*,]. Prepared February 2015. Coastal Communications and Public Relations, Inc.

below 50 feet, Florida's main advantage has always been its location as the closest U.S. market to the Panama Canal. Its location, together with the large and growing consumer market as well as strong regional transportation links could allow Florida to be used more as crucial link to service other markets along the East Coast.

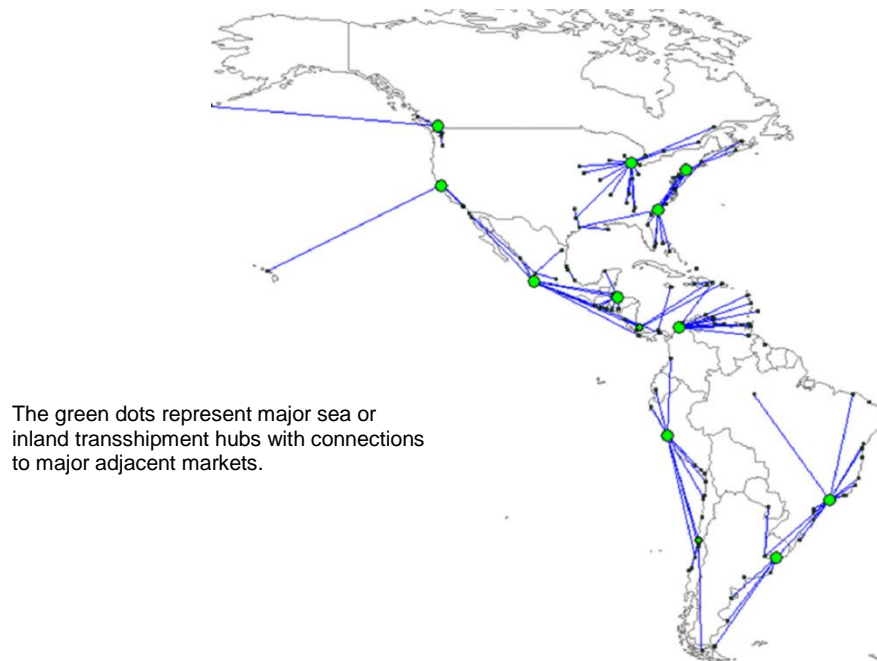
Florida, like other markets, handles both international and domestic trade. The state is part of a 'hub-and-spoke' system along the Eastern Seaboard. The hubs are major transshipment points in the U.S. and Caribbean that "provide connectivity between short distance feeder lines (and ports) and long distance deep-sea lines, linking regional and global shipping networks. They act as a point of consolidation for regional traffic where the hub relies on its central location that commands access to a region."²⁹ The major transshipment hubs can handle some of the largest container ships on the seas while smaller feeder ports traditionally only accept ships with loads up to 1,000 to 5,000 TEUs. The system along the East Coast does not have one hub and several feeders but several hubs with multiple feeder ports. At times, hubs are considered feeder ports to other hubs depending on the cargo and where its fits along the supply chain.

The other improvement ports are making is increasing the efficiency of moving cargo through ports onto inland transportation networks. The goal behind increasing efficiency is to make ports more functional and a better alternative than competitors to be utilized as a regional hub for cargo. Regional diversification for shippers encourages competition which can cut costs and spreads the risk of relaying on one major port for supply chains. Florida ports are not looking to be major transshipment hubs. They are looking to chip away at business going to other regional port that are being used as hubs. They are also looking to capture more of the 3.5 million TEUs that come to the state overland via truck or rail that are delivered initially to other ports.³⁰

²⁹ "The Insertion of Transshipment Hubs." Hofstra University. Accessed July 15, 2017. <https://people.hofstra.edu/geotrans/eng/ch4en/conc4en/insertionoffshore.html>.

³⁰ "State of Florida's Seaports 2015, Competitive Committed Connected." *Florida Ports Council*. Prepared February 2015. Coastal Communications and Public Relations, Inc.

Map 2: Spatial Pattern of the Global Shipping Network and its Hub-and-Spoke System



Source: Wand, Chengjin & Jiaoe. Accessed July 10, 2017.

https://www.researchgate.net/publication/238638157_Spatial_pattern_of_the_global_shipping_network_and_its_hub-and-spoke_system.

Supply chains include hub-and-spoke systems for waterborne and inland transportation networks that tie together intermodal facilities, rail networks, interstate systems and inland waterways. These backend connections are a critical part in port expansion as the logistical focus is on cost, reliability and speed to connect cargo to end customers. Markets with a well-integrated system of connectivity between ports and inland transportation networks can potentially improve utilization in supply chains.

2.2.1 Cost and Speed-of-Delivery

The value of global trade to and from Florida grew from \$4.4 billion in 1960 to \$147 billion in 2016 (both in constant US dollars). The state's place in supply chains is increasingly determined by the speed with which goods are processed at its ports. East Coast ports are historically not the main direct route used from Asia. Approximately 65% of Asian imports came to the U.S. via transpacific lines, mainly using facilities at the Ports of Los Angeles and Long Beach. The overriding reason was cost and speed. It took an average of 18.2 days for ships to make the crossing.³¹ Cargo was then transferred from ships to rail or truck for inland distribution to end markets. Currently, only

³¹ "Florida Trade & Logistics Study." *Florida Chamber Foundation and Florida Department of Transportation*. Cambridge Systems. February 2011.

19% of Asian imports are processed through ports not on the West Coast. The ability to expand trade is hampered by the extra time it takes to go through the canal. Ships using the Panama Canal take an average of 21.6 days to reach East Coast ports from Asia.³² There are only three and a half days that separate the two routes.

The speed-to-market between the West and East Coasts is one factor that carriers use to decide which port to call on. Supply chains are synchronized and scheduled based on ship speeds. If a ship is late in reaching a port, it has the potential to cause significant back up. The same is true if a ship reaches a port and is then held up by on-dock cargo handling issues, including labor unrest and freight processing. The loading and unloading of cargo are still the most inefficient components to the whole supply chain. "Although automated stacking cranes, automated ground transportation and computer-driven operating system have been available for 20 years, 94% of all container terminals globally are still manual."³³ Ports push upgrades to cargo-handling technology for more efficiency and include the addition of large gantry cranes for stacking containers as well as expanded storage facilities at or near ports, on-dock rail connections and state-of-the-art electronic tracking systems. Since most ports, including those in Florida, do not have fully automated facilities "port times per container are an increasing function of ship size."³⁴ In other words, the larger the ship, the more time a container will spend at the port. Depending on the port, this has the potential to decrease or increase the time differential between the direct East and West Coast routes.

Map 3 below shows estimated times for cargo from PortMiami (as well as Port Everglades which is less than an hour north) will take to reach markets up and out-of-state. Both ports have on-dock intermodal terminals "which now have the ability to provide truck-like, next-day service to Orlando and the giant Central Florida market as well as two-day service to cities in the Southeast."³⁵ Before the rail service, the most cost effective way for international carriers to reach markets in Central Florida was to truck cargo in from ports in Jacksonville or Savannah. This does not show the estimated amount of time for cargo handling once a ship is in port. The half-day extra that JAXPort enjoys because of its better location closer to other markets provides a competitive advantage to carriers compared to ports in South Florida.

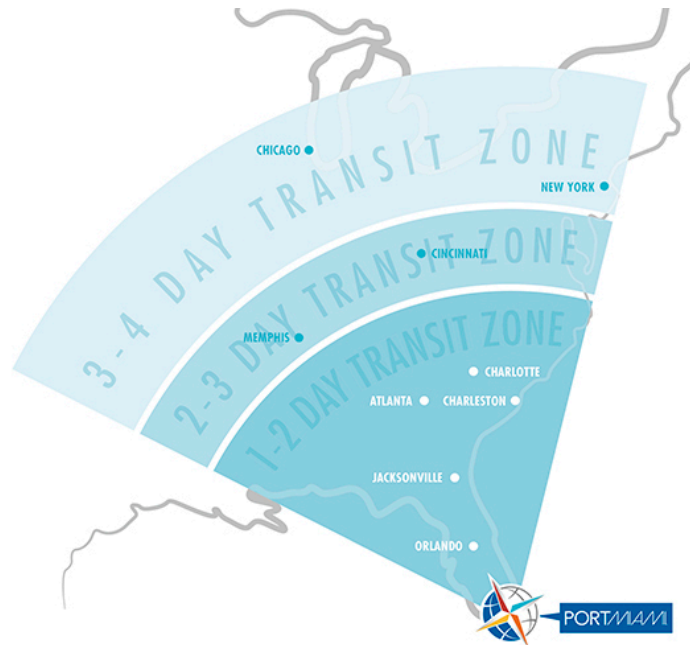
³² "Florida Trade & Logistics Study." *Florida Chamber Foundation and Florida Department of Transportation*. Cambridge Systems. February 2011.

³³ Hutchins, Reynolds. "US Marine Terminal Modernization Slows as More Big Ships Call". JOC.com. April 11, 2017.

³⁴ Mooney, Turloch. "Shippers Partly to Blame for Port Congestion, report argues." JOC.com. May 8, 2017.

³⁵ Kulisch, Eric. "Florida's Freight Railroad." *American Shipper*. December 2015. Accessed July 29, 2017.

Map 3: Transport Time from South Florida



Source: "PortMiami," accessed July 29, 2017, <http://www.miamidade.gov/portmiami/perishables.asp>.

The cost to ship containers is a major consideration for supply chains. Shipping by sea is the most effective way to move cargo. Based on economies-of-scale, ships can handle larger loads at a fraction of the cost than other modes of transportation. The base cost to ship directly from Asia to an East Coast port is double the cost of using West Coast ports. West Coast ports are able to charge less per container because of the volume of cargo handled. On top of port costs, overland charges and tolls to move cargo cross-country add significantly to the overall cost to deliver containers to end markets on the East Coast. In fact, many carriers using West Coast ports typically impose upfront on carriers a \$1,000 surcharge per container due to "West Coast congestion" which is a blanket term used to cover any issues carriers may encounter due to backlogs at the ports.³⁶ Moreover, every time a container is shifted from one mode of transportation to another (i.e. truck to rail or rail to truck), an additional cost is added. Cargo travelling from the West Coast may have to be shifted between modes three to four times before end markets. Cargo using ports on the East Coast, depending on where it was going, would only be shifted once or twice before end markets.

Even though the docking fees and costs at East Coast ports are higher than at West Coast ports, carriers are pushing for more direct trade from Asia to the East Coast because of the potential to control more ancillary overland shipping costs in addition to avoiding congestion issues at West

³⁶ "West Coast alternatives: More time, more cost." accessed July 15, 2017. <http://www.cnbc.com/2015/02/18/west-coast-alternatives-more-time-more-cost.html>.

Coast ports. The variety of East Coast ports, as well as their closeness to end markets, gives carriers several different options for supply chains. If costs are the overriding factor in carriers' choice of a port, then the 3 ½ day difference between using the West or East Coasts becomes secondary. It is one of the incentives ports on the East Coast had to improve their capabilities to handle increased traffic from larger ships and also enhance cargo handling efficiencies. *"Economies-of-scale in the seagoing supply chain allow carriers to move more TEUs per vessel through the canal than before. It reshapes shipping patterns since importers that normally bring Asian-originating ocean cargo in through West Coast ports for movement inland via surface transport instead could opt for a less-costly all-water route for drop off at East and Gulf ports. Only 30% of all seagoing cargoes are discharged at points east of the Mississippi, although 70% of the U.S. population lives there."*³⁷

2.2.2 Florida Trade Flows

Waterborne trade flows into and out of Florida in three directions. The first is the East/West routes that connect with markets in Europe, Asia and to a lesser extent Africa. The second is the North/South trade route that relates to Central/South America, the Caribbean and Canada. The third direction is domestic trade with other markets in the U.S. As a large consumer market with a limited manufacturing base, Florida imports more than what it exports. In fact, a large portion of goods from international trade come to Florida from out-of-state ports that is shipped overland to the state via truck or rail. Currently, of the 7.0 million TEUs that the state brings in from international trade, 3.5 million TEUs are processed at Florida's ports and the other 3.5 million TEUs come by land that originate from out-of-state ports. As highlighted in Graph 4 below, by 2021 the number of waterborne TEUs handled by Florida seaports will rise by 1.5 million to 5.0 million TEUs.

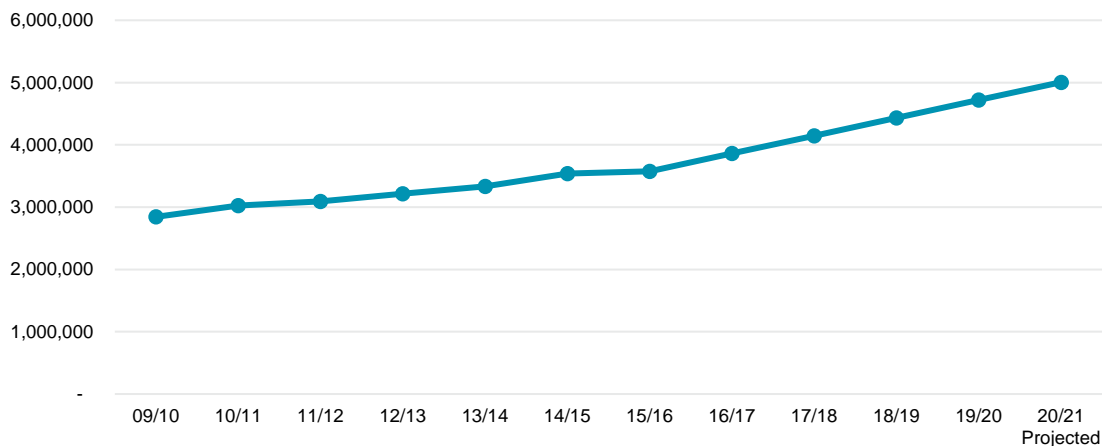
In 2016, Florida seaports recorded a large trade deficit in trade, importing significantly more from Asian and European markets than what they could export. On the other hand, they had a narrowing trade surplus with trading partners to the south, exporting \$7.8 billion more than they imported from the region, on the strength of two way trade in commodities and manufactured parts. The state's waterborne trade deficit with Asia widened, up by \$1.7 billion to \$14.0 billion in 2016. Florida's largest import trading partners remained China while Brazil continued to be its top export market. Taken together, China leads all markets in two-way trade.³⁸ In 2016, the total state trade import to export split was 53.8% to 46.1%, and the waterborne import to export split was 60.1% to 39.9%. Inbound trade from other U.S. markets was mostly inbound since Florida does not domestically export a significant amount of goods to other U.S. markets.

³⁷ Solomon, Mark B. "DC Velocity." *Transportation Report, Maritime & Port Services*. October 4, 2011.

³⁸ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. Page 29.

Florida is a globally competitive economy that serves “as a hub for international and domestic trade.”³⁹ Its large consumer market helps the state to maintain and strengthen connectivity to other markets, both in the U.S. and internationally. “Florida is located at the crossroads of east-west and north-south trade lanes that will be home to more than 1.1 billion consumers by 2030.”⁴⁰ International trade over the last 50 years developed initially along an east-west axis with goods and commodities moving between Europe, Asia and the United States. The north-south trade lanes were developed to capture growth and move raw materials from the rising economies in Central/South America and Africa to the more developed economies in the northern hemisphere. Even though growth in the current economic cycle after the last recession ended has been slow to pick up on the north-south axis as compared to the east-west axis, shifts could happen with significant changes in commodity prices. In fact, “during the next 50 years, over 80% of all worldwide economic growth will occur outside of the United States.”⁴¹

Graph 4: Container TEUs Handled by Florida Seaports FY 2006 to 2021 (Projected)



Source: Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan, April 2017, Florida Ports Council.

Florida is unique because its location allows it to be a potential natural conduit of increased trade from all regions and play an important part in global supply chain strategies. At Table 6 indicates, Florida trades with every other region in the world. Every day, an average of 300,000 tons of freight and 42,000 passengers move through Florida's seaports.⁴² Its large consumer base supports the need to import both finished goods and raw materials. Second, the diverse population

³⁹ “Florida Transportation Trends and Conditions – Travel Demand: Trade & Freight Transportation Demand.” *Florida Department of Transportation. Office of Policy Planning*. July 2012.

⁴⁰ “Florida Trade & Logistics Study.” *Florida Chamber Foundation and Florida Department of Transportation*. Cambridge Systems. February 2011.

⁴¹ “Florida Trade & Logistics Study.” *Florida Chamber Foundation and Florida Department of Transportation*. Cambridge Systems. February 2011.

⁴² Solomon, Mark B. “DC Velocity.” *Transportation Report. Maritime & Port Services*. October 4, 2011.

with direct linkages to many other markets, including most in Central and South America, make it easier for foreign companies from that region to work within the state and conduct business.

Table 6 shows that seven of Florida's top ten trading partners are from the Western Hemisphere with only China, Japan and Germany from outside of the region. Even though they are farthest from Florida, those three markets account for almost 40% of all trade with Florida. The balance of trade on the North/South lane "make it a model of two-way trade that supports economic growth"⁴³ and benefits Florida's position in supply chains to those markets. The bulk of non-containerized trade with regions south of the border are in commodities and raw material with some finished goods.

Table 6: Florida Waterborne Imports & Exports by Global Region (US\$ 000,000) 2016

Region	Imports			Exports		
	2015	2016	% Change	2015	2016	% Change
South/Central America/Caribbean	\$17,889	\$16,478	-7.9%	\$27,443	\$24,262	-11.6%
Asia & Middle East	\$18,053	\$18,207	0.9%	\$5,757	\$4,224	-26.6%
Europe	\$9,705	\$9,940	2.4%	\$1,615	\$1,670	3.4%
North America	\$3,210	\$2,824	-12.0%	\$920	\$845	-8.2%
Africa	\$257	\$169	-34.2%	\$836	\$3,093	270.0%
Australia/Oceania	\$235	\$176	-25.1%	\$299	\$186	-37.8%
Total	\$51,364	\$49,810	-3.0%	\$38,885	\$36,296	-6.7%

Source: Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan, April 2017, Florida Ports Council.

Table 7: Florida Top Ten Trading Partners for Waterborne Cargo (by Value) 2016

Country	Value of Trade (millions)	Rank	% Change 2015/2016
China	\$6,635.1	1	-1.2%
Japan	\$6,410.3	2	0.3%
Dominican Republic	\$5,238.5	3	3.6%
Honduras	\$4,124.7	4	-7.7%
Brazil	\$4,012.3	5	-10.5%
Mexico	\$3,221.1	6	39.5%
Chile	\$2,959.2	7	-15.7%
Germany	\$2,743.6	8	23.9%
Costa Rica	\$2,616.7	9	-0.1%
Columbia	\$2,228.7	10	-17.9%
Total Top 10	\$40,190.1		-8.0%
Total All Countries	\$79,288.9		

Source: Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan, April 2017, Florida Ports Council.

⁴³ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. Page 27.

Florida's trade with other markets in the Southeast plays an oversized role in how Florida is viewed in supply chains. Over 47% of all waterborne trade comes from ships that dock at other U.S. markets before the cargo is shipped by truck overland to Florida consumers. The state's ports are working hard to capture part of the estimated 3.5 million TEUs of cargo volumes that originate in or are destined for Florida, but are currently routed using out-of-state ports. It means that Florida ports are currently only capturing about 1 in 2 available TEUs.⁴⁴ *Nearly one half of all trucks, rail cars, ships and cargo planes which bring goods to Florida have to return empty to other markets, adding costs to delivery of goods in state.*⁴⁵ The simple fact is that *"inbound freight tonnage is nearly 80% larger than outbound freight tonnage."*⁴⁶ *For every four loads headed to consumer markets in Florida, only one will move north.*⁴⁷

Table 8: Florida Waterborne Imports, Exports and Domestic Tonnage (By Port) 2015 to 2016

	Imports	Exports	Domestic	Total
Canaveral	4,117,640	64,737	1,342,101	5,524,478
Everglades	8,375,823	3,233,757	13,071,751	24,681,331
Fernandina	27,278	269,596	-	296,874
Fort Pierce	25,800	30,800	-	
Jacksonville	8,905,154	2,666,914	7,445,726	19,017,794
Manatee	6,707,711	181,046	-	6,888,757
Miami	4,749,255	4,028,719	-	8,777,974
Palm Beach	540,162	1,195,403	783,690	2,519,255
Panama City	774,760	1,087,865	17,776	1,880,401
Pensacola	75,850	30,506	94,653	201,009
Tampa	6,204,006	3,498,072	27,823,375	37,525,453
Total 2015/16	40,503,439	16,287,415	50,579,072	107,313,326

Source: Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan, April 2017, Florida Ports Council.

Domestic cargo in Table 7 above is international cargo that comes to the state via ships from other U.S. ports. This is different than tonnage that comes to the state using road and rail infrastructure which predominantly includes liquid and dry bulk commodities such as petroleum and phosphates products as well as sugar and aggregates.⁴⁸ From a strict import/export standpoint, Florida takes in 24.2 million tons more than what it exports, with imports accounting for roughly 71% of all trade.⁴⁹ Generally, the decrease in value of waterborne cargo highlighted in Table 5 is the result of positive economic trends. Florida's residents enjoyed a large reduction in the cost of many everyday purchases last year, including gasoline. Exchange rates were extremely favorable for online and other imported purchases, both consumers and industry.⁵⁰

⁴⁴ "State of Florida's Seaports 2015, Competitive Committed Connected." *Florida Ports Council. Prepared February 2015. Coastal Communications and Public Relations, Inc.*

⁴⁵ "The Statewide Economic Impact of Florida Seaports." *Florida Ports Council. December 2016.*

⁴⁶ "The Statewide Economic Impact of Florida Seaports." *Florida Ports Council. December 2016.*

⁴⁷ Solomon, Mark B. "DC Velocity." *Transportation Report, Maritime & Port Services. October 4, 2011.*

⁴⁸ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council. April 2017. P. 43.*

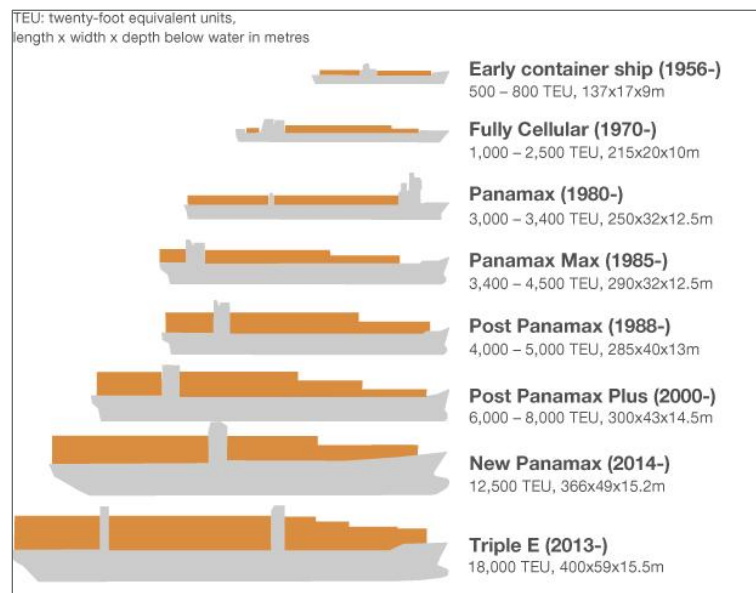
⁴⁹ "The Statewide Economic Impact of Florida Seaports." *Florida Ports Council. December 2016.*

⁵⁰ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council, April 2017. P. 26.*

Waterborne trade comprises the majority of the state's total trade, by value – now 58.6%.⁵¹ Container cargo tonnage grew 4.2% and the number of TEUs grew by 0.9%, dry bulk grew by 1.8% and liquid bulk by 5.8%. At \$50.1 billion, containerized cargo increased slightly (up from \$49.8 billion), and represented a slightly higher share (at 63.2%) of the waterborne cargo value than in 2015.⁵² Though container traffic only accounts for about 21% of all seaborne trade in Florida it represents almost two-third of all value.

2.2.3 Post-Panamax Shipping

Table 9: Overview of Containership Sizes



Source: "Biggest Container Ships – Industry Overview," accessed July 14, 2017, www.vesseltracking.net.

Table 9 above shows that containerships are on their 8th generation in sizes. The Panama Canal limited the size of ships because of the width of the channels that were constructed. This came to be known as the Panamax Standard. Those ships had a capacity of about 4,500 TEUs max.⁵³ These *Panamax* ships could transverse the canal and connect with deep-water ports in the Atlantic. New *Post-Panamax* ships, called that because they could not use the Panama Canal, were designed in the late 80's, and would be used on trade routes in the Pacific or Atlantic. Carriers focused on economies-of-scale and pushed sizes of ships every five-years starting in the early

⁵¹ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. P. 26.

⁵² "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. P. 27.

⁵³ "The Geography Of Transport Systems." (<https://people.hofstra.edu/geotrans/eng/ch3en/conc3en/containerships.html>). Accessed June 26, 2017.

1990s. The only two limitations to these larger size ships are a port's ability to handle them and the inability of the Panama Canal to accommodate them.

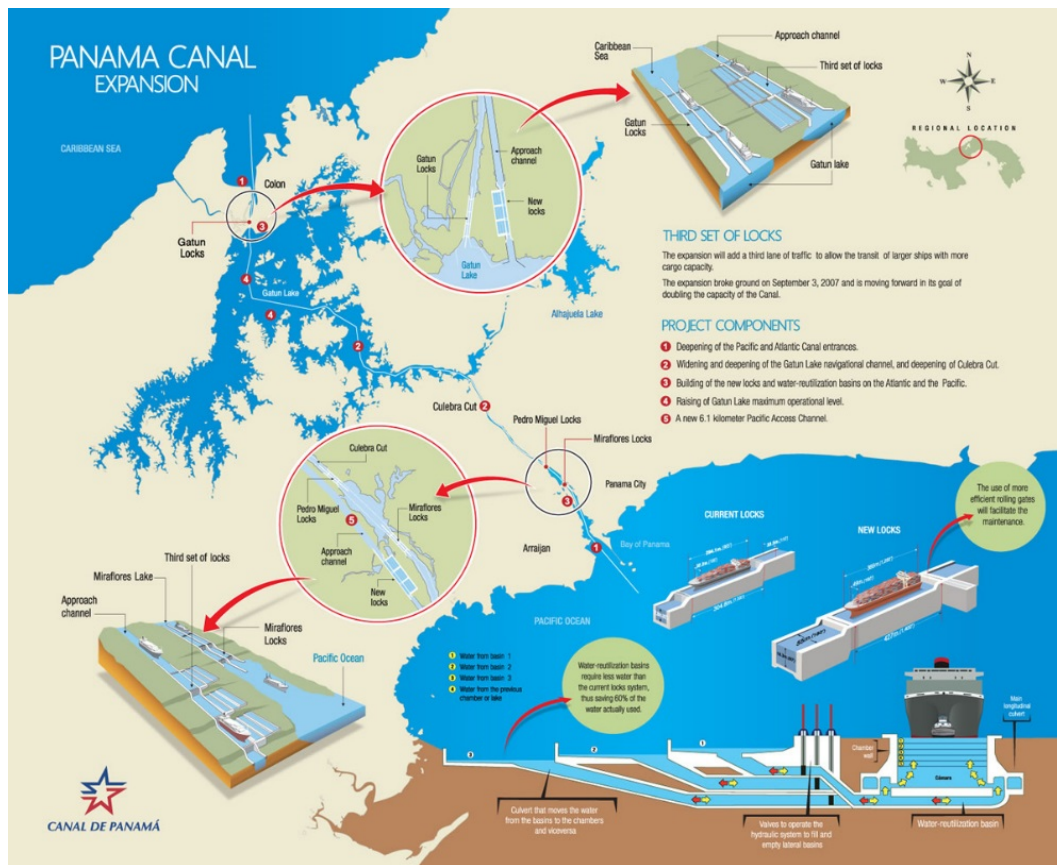
Starting in 2006, construction started on the Panama Canal's expansion with the plan to capture additional trade traffic from West Coast ports. Around this time there was also uncertainty and a slowdown at West Coast ports due to labor unrest in 2003/2004 (and again in 2014/2015), overall congestion issues and the higher freight costs to move goods cross-country. These trends led many carriers to seek alternative ways to move cargo from Asia to the U.S. They were fed by carriers' desire to apply economies-of-scale to build and deploy larger ships on trade routes, and gave confidence to push forward with expansion plans at the canal.

At a cost of \$5.4 billion, the expansion at the Panama Canal increased capacity to allow containerships holding up to 14,500 TEUs. As shown in Map 4 below, the upgrades included widening the canal by 70 feet and deepening by 18 feet. This allowed ships through with up to 190 feet in width and with depths over 50 plus below sea level. The expansion included the construction of a new set of locks on both the Atlantic and Pacific sides, a new third lane for traffic which doubled the capacity and also improved existing navigational channels.⁵⁴

Containership sizes have always been based on the number of TEUs handled. The *Post-Panamax* ships, including *Post-Panamax Plus* ships, could hold up to 8,000 to 10,000 TEUs. While they could handle larger amounts of TEU's, there were a limited number of ports that were equipped to service them. In essence, as ships grew larger, it became the more important it became for port to expand capacity. This pushed many ports in the mid-2000s to initiate improvements. When the expansion at the Panama Canal was completed in 2016, it allowed ships with up to 14,500 TEUs to move through its locks. Those ships were not even the biggest containerships currently working the trade routes. As noted in Table 9 above, Triple E class ships could hold a staggering 18,000 to 20,000 TEUs. The larger-sized ships and expanded Panama Canal marked a fundamental shift in how cargo from Asia came to the U.S. It challenged the West Coast's dominant market share and allowed ships to use ports on the Atlantic side to take advantage of larger economies-of-scale. The move to larger ships also meant that many traditional smaller Panamax-sized ships would be decommissioned or scrapped as inefficient or too labor intensive for cargo handling. These are the types of ships that have traditionally used ports in Florida. If they were being phased out, the ports would have to upgrade their facilities to remain relevant and used by larger ships.

⁵⁴ The Expanded Panama Canal. (<http://micanaldepanama.com/expansion/>). Accessed June 24, 2017.

Map 4: The Expanded Panama Canal

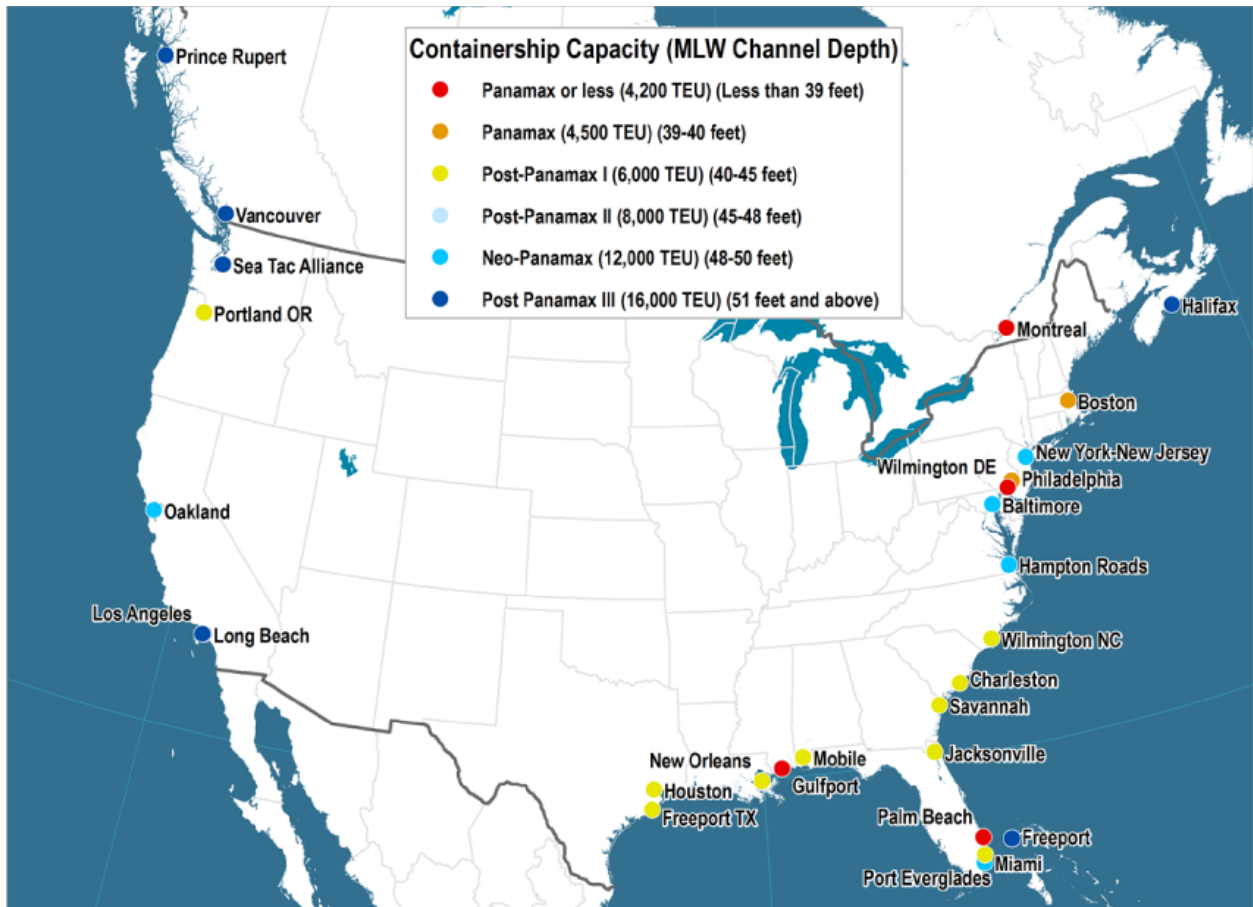


Source: Canal de Panama, (<http://micanaldepanama.com/expansion/faq/#prettyPhoto>), accessed June 26, 2017.

Going beyond Panamax-sized ships was perceived as a risk in terms of the configuration of shipping networks, additional handling infrastructure as well as draft limitations at ports.⁵⁵ As noted in Map 5 below, most ports on the East and Gulf Coasts do not have the depth needed for Post Panamax ships. The economies-of-scale in the movement of cargo made sense and allowed for more TEUs to be shipped at one time at a lower cost from Asia to the U.S. Most ports on the East and Gulf Coasts were not equipped to accept larger container ships or handle the increased amount of TEUs. There were only a few ports that could allow the largest Post-Panamax ships to dock and most were on the West Coast. Smaller East Coast ports that wanted to compete with the new larger ships that were going to come through the expanded Panama Canal, were going to have to embark on extensive improvements to increase capacity. This was exactly what happened over the last ten years.

⁵⁵ "The Geography of Transport Systems." Accessed June 26, 2017.
<https://people.hofstra.edu/geotrans/eng/ch3en/conc3en/container ships.html>.

Map 5: Containership Capacity at U.S. Ports



Source: Hofstra University. "The Geography of Transport Systems." Accessed July 31, 2017.

<https://people.hofstra.edu/geotrans/eng/ch4en/conc4en/uswaterwaysystem.html>.

2.2.4 Competitive Ports and Transshipment Ports

Every major port along the East Coast is spending vast amounts of money to increase capacity and their attractiveness to carriers in supply chains. Why? Almost all competitive out-of-state ports are working on, or in the planning stages, for major projects to increase capacity and improve efficiency. Part of this push and capital investment is to enable some ports to be like a hub that could serve multiple markets. Transshipment hubs are intermediate destinations for cargo before it can move to another market. Larger containerships offload cargo at a transshipment hub and the cargo is then consolidated and sorted and then shipped to adjacent markets. Hubs are ideal since they provide carriers the ability to sort cargo from multiple sources and repackage it for transport to other markets. Hubs also cut down on the numbers of ports large ships need to dock to service multiple markets. Hubs provide connections to feeder ports that service local markets.

They act as a point of consolidation of regional traffic where the transshipment hub relies on a central location commanding access to a region.

Historically, ports on the East Coast initially developed as transshipment hubs because of established trade lanes, deeper channel depths and better facilities to handle cargo from larger ships. From a logistics standpoint, it made sense for larger vessels to use these hubs which subsequently feed cargo to smaller ports along the East Coast. Some smaller ports have the characteristics of a hub since they service other regional markets by sea or landside connections. The ports in Savannah, Charleston and Boston are now considered transshipment hubs since cargo at these ports are transferred to other ships which deliver to other markets. With the Panama Canal expansion, ports on the East Coast, including the major ones in Florida, now have a better opportunity to change some supply chains and be utilized as a hub for regional markets.

There are pluses and minus for a port being a transshipment hub. On the plus side, hubs allows for higher vessel utilization. For a negative, transshipment hubs are notorious for congestion issues for ships docking and for cargo to be transferred out of the port. When cargo moves through a hub, there is additional costs that are added compared if the cargo went directly to a receiving port. Moreover, there is a valid fear by some in the logistics and carrier industry that the investment to increase the capacity at many ports to be seen more in supply chains as transshipment hubs will not lead to increased business. Not all ports can be traditional hubs since the additional options for carriers can create unnecessary complexity in logistics planning. Carriers are “most likely to combine service at smaller ports to direct services on bigger ships to larger ports with transshipment services.”⁵⁶ Unless there is a compelling reason to change (i.e. significant cost savings), carriers will not make the switch.

The port of Savannah in Georgia is the largest port closets to Florida, about 120 miles north of the state line. It processes hub-like business where a portion of its container traffic is consumed in other Southeast markets, including Florida. Though Savannah has a relatively shallow harbor depth of 42 feet, it remains the only East Coast seaport with on-dock rail connections to the major railroads, CSX Corp. and Norfolk Southern Corp.⁵⁷ The on-dock rail connection is a competitive advantage because it compresses the amount of time it takes to process cargo from a ship to end customers. With planned increases in depth to 47 feet and on-dock rail, Savannah will continue to be a logical choice for many carriers looking for convenience and speed-to-market. Florida ports will be hard pressed to capture existing market share from Savannah.

⁵⁶ Bonney, Joesph. “Panama Canal Expansion Will Affect Shipping – But How?” www.joc.com. June 25, 2016.

⁵⁷ Solomon, Mark B. “DC Velocity.” *Transportation Report, Maritime & Port Services*. October 4, 2011.

Table 10: Existing and Planned Depth at East Coast Ports

State	Port Name	Current Depth	Planned Depth
Maryland	Baltimore	50	N/A
Massachusetts	Boston	40	47
South Carolina	Charleston	45	47
Delaware River	DE, PA, NJ Ports	40	45
Florida	JAXPort	40	47
Florida	PortMiami	50	N/A
Florida	Port Everglades	42	48
New York	New York/New Jersey	50	N/A
Virginia	Norfolk/Hampton Roads	50	55
Georgia	Savannah	42	47

Source: Individual port websites, accessed July 24, 2017.

Florida ports' ability to siphon off container traffic and increase the usage by larger containerships will be constrained because some will not provide the flexibility and convenience that other hubs have. In order to pull carriers from other hubs, Florida ports must provide a compelling case (cost savings and efficiency) for carriers to switch. Since they are smaller ports with less traffic, Florida ports are able to provide a certain level of convenience and quicker speeds-to-market for some type of cargo. As smaller ports, they are also able to offer lower port and cargo handling fees compared with larger ports. While these are some advantages for carriers to use Florida ports, other variables are stacked against two of the ports. The biggest drawback for Florida's three largest container ports is the lack of a strong exporting component to the amount of imported cargo. The imbalance, most acute at JAXPort and Port Everglades, negates any cost benefit in using those ports since empty containers cost the same to ship as full ones. The major issue with the two ports in South Florida, PortMiami and Port Everglades, is their location on the end of a peninsula removed from other market in the Southeast. Cargo from those ports have the potential to add a half to full day on travel time north.

2.3 Key Takeaways

In the research provided, I have been able to establish four points that justify the need for Florida ports to expand capacity:

- *Consumer Growth* – Florida's population growth and consumer spending power make it a major market in international trade which will only grow in importance over the next decade. The dynamic could provide carriers with the incentive to shift operations to Florida ports away from out-of-state competitors.
- *Changing Supply Chains* – Container traffic from Asia traditionally went through West Coast ports. With the Panama Canal expansion, more container traffic is now directly linking with ports on the East Coast. Florida is the closest U.S. market to trade lanes from the canal. It is also at the epicenter of the increasing north-south trade with Central and Latin America.
- *Increased Ship Sizes* – Half of all ships being built today can handle at a minimum 8,000 TEUs. Florida ports, with the exception of Miami, do not have the required depth for larger ships to dock as well as the infrastructure in place to efficiently move thousands of containers quickly from ports onto transportation networks.
- *Cost Focus* – Carriers look to minimize delivery costs when choosing ports for supply chains. For some types of cargo, ports in Florida can be utilized more if they are able to process cargo just as quickly and for a lower cost than alternative ports along the East Coast.

Ports in the U.S. have spent "more than \$150 billion to deepen harbors, expand marine terminals for processing cargo and improve rail and road connection to their docks."⁵⁸ Ports with the ability to handle ships with TEU counts over 10,000 could potentially see increased traffic by the larger ships which will soon rule the trade in containers. Those ports that do not or are unable to accommodate the biggest ships will lose out as trade expands.

⁵⁸ Bonney, Joseph. "Panama Canal Expansion Will Affect Shipping – But How?" www.joc.com. June 25, 2016.

3.0 Seaport Management and Resource Allocation

Florida's fifteen deep-water ports are run as independent entities. They are managed by "seaport authorities focused on base infrastructure financing issues such as dredging and landside access, and enter into lease agreements with a variety of private sector terminal operators that provide the cargo and cruise operations."⁵⁹ The goal of seaport authorities, like any private enterprise, is to expand business opportunities and maximize profits to share and stake holders. Since it is a public/private partnership, consideration is also given to the economic benefits to communities in which they are located. Ports are job generators, create billions in direct and indirect demand for goods and services locally and produce significant tax income for local markets.

There is some statewide coordination between ports through the Florida Seaport Transportation and Economic Development Council (FSTED) and the Florida Ports Council (FPC). The FSTED is "a public entity created by statute and charged with carrying out the state's economic development mission through implementation of seaport capital improvement projects at the local level."⁶⁰ The FPC is a Florida nonprofit corporation that serves as the professional association for Florida's fifteen public seaports and their management."⁶¹ Both agencies have representatives from all fifteen ports as part of their governing boards. It is not the job of these agencies to pick winner or losers. They are cheerleaders for the success of all ports and the trade industry. They collectively advocate for funds for capital improvement projects at all of the ports.

This paper notes that there is an inherent conflict of interests in how ports are managed in Florida. They are independently run seaport authorities whose sole focus is to grow their business. Ports compete not only with out-of-state ports but also with other ports in Florida. Statewide agencies that help with resource allocation do not award money based on which port has the best chance to grow market share from other ports along the East Coast. The FSTED and FPC take an incremental approach which tries to improve the infrastructure and capabilities at as many ports as possible. If we look at the five-year capital improvement program for 2017-2021, highlighted in Table 11, only two ports receive no funding. These two ports are geographically isolated from major population clusters in the state and process no container cargo nor are they used by the cruise ship industry.

⁵⁹ "Seaport Governance Models" *Joint report from Florida Tax Watch and Florida Ports Council*. June 2014. P. 6.

⁶⁰ "Florida Seaport Transportation and Economic Development Program." accessed July 13, 2017. <http://flaports.org/about/florida-seaport-transportation-and-economic-development-program>.

⁶¹ "Florida Ports Council." accessed July 13, 2017. www.flaports.org.

Table 11: Five-Year Capital Improvement Program 2017 - 2021

	FY 2016/2017	FY 2017/2018	FY 2018/2019	FY 2019/2020	FY 2020/2021	Total
Canaveral	\$43,673,000	\$36,365,000	\$33,713,000	\$152,272,000	\$35,509,000	\$301,532,000
Citrus	\$0	\$0	\$0	\$0	\$0	\$0
Everglades	\$243,615,000	\$197,836,000	\$137,538,000	\$143,756,000	\$43,733,000	\$766,478,000
Fernandina	\$475,000	\$525,000	\$1,100,000	\$11,310,000	\$3,910,000	\$17,320,000
Fort Pierce	\$810,000	\$4,446,000	\$10,965,000	\$17,500,000	\$5,500,000	\$39,221,000
Jacksonville	\$244,194,000	\$70,704,000	\$142,630,000	\$152,023,000	\$142,992,000	\$752,543,000
Key West	\$0	\$0	\$0	\$0	\$3,500,000	\$3,500,000
Manatee	\$6,557,000	\$2,000,000	\$2,500,000	\$12,000,000	\$11,500,000	\$34,557,000
Miami	\$129,200,000	\$76,620,000	\$30,274,000	\$26,000,000	\$10,000,000	\$272,094,000
Palm Beach	\$15,790,000	\$5,200,000	\$28,700,000	\$1,200,000	\$2,700,000	\$53,590,000
Panama City	\$10,350,000	\$32,550,000	\$19,100,000	\$16,100,000	\$19,000,000	\$97,100,000
Pensacola	\$3,722,000	\$5,000,000	\$5,000,000	\$750,000	\$500,000	\$14,972,000
Port St. Joe	\$0	\$0	\$0	\$0	\$0	\$0
St. Petersburg	\$1,057,000	\$500,000	\$1,375,000	\$1,375,000	\$0	\$4,307,000
Tampa	\$63,800,000	\$90,100,000	\$89,550,000	\$130,250,000	\$59,800,000	\$433,500,000
Total	\$763,243,000	\$521,846,000	\$502,445,000	\$664,536,000	\$338,644,000	\$2,790,714,000

Source: Florida Ports Council, Five-year Florida Seaport Mission Plan – 2017-2021.

As Table 11 details, capital improvements over the next five years at the five largest ports are focused on increasing capacity and efficiency. This means that digging channels deeper to allow larger ships are just one component to making ports more attractive to larger ships. Quickly moving cargo from ship to shore, or vice versus, are critical to streamlining the cargo handling process, including the movement of cruise passengers. Anticipated improvements at Florida's ports are diverse and include both those on the land and in the water. Landside work could comprise new cargo terminals, new or rehabilitated cruise terminals, land acquisition, berth repairs, construction of intermodal road and rail connections and other miscellaneous projects. Channel and harbor deepening only account for 16.1% of the five-year capital improvement budget, or \$450 million.⁶²

The simple fact is that for every dollar (\$1.00) invested at the ports there is an exponential effect on the state economy through jobs generated as well as direct and indirect consumption expenditures. The Florida Department of Transportation recently commissioned "a study that showed that every \$1.00 invested in the seaports yields \$7.00 to the state economy."⁶³ The \$2.8 billion proposed in the five-year capital improvement plan represents an almost \$20 billion bump to Florida's economy. The \$2.8 billion in capital improvements for the next five years represent a wish list for each port and they are all competing for money from local, state and national resources. Decisions on what to invest in are not made from a strictly market-based standpoint. The research does not show that funds go to the port that has the potential to maximize returns and is best

⁶² "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. P. 14.

⁶³ "Florida Seaports Fast Facts." *Florida Department of Transportation and the Florida Ports Council*. July 2016.

positioned to compete with out-of-state ports. Public policy goals rarely align with market-based decision making. Florida's government and statewide port advocacy agencies have a compelling interest to spread economic prosperity as widely as possible, even at the cost of reducing the state's chance to compete better with other markets. It does not mean that the State allocates investments in a vacuum. There are reports that perform rigorous return on investment analysis to determine the effect of how the money being spent will impact port operations and the local economy. The outside consultants compile market feasibility studies and provide objective analysis covering the implications of timing of projects and the total maximum economic benefit to each port. The conclusions presented focus on the economic benefits to local markets and to the state overall. They do not address how capital improvements at individual ports will help in making Florida a more attractive market in supply chains how the increase in capacity at Florida ports will capture more traffic from competing out-of-state ports.

4.0 Individual Port Profiles

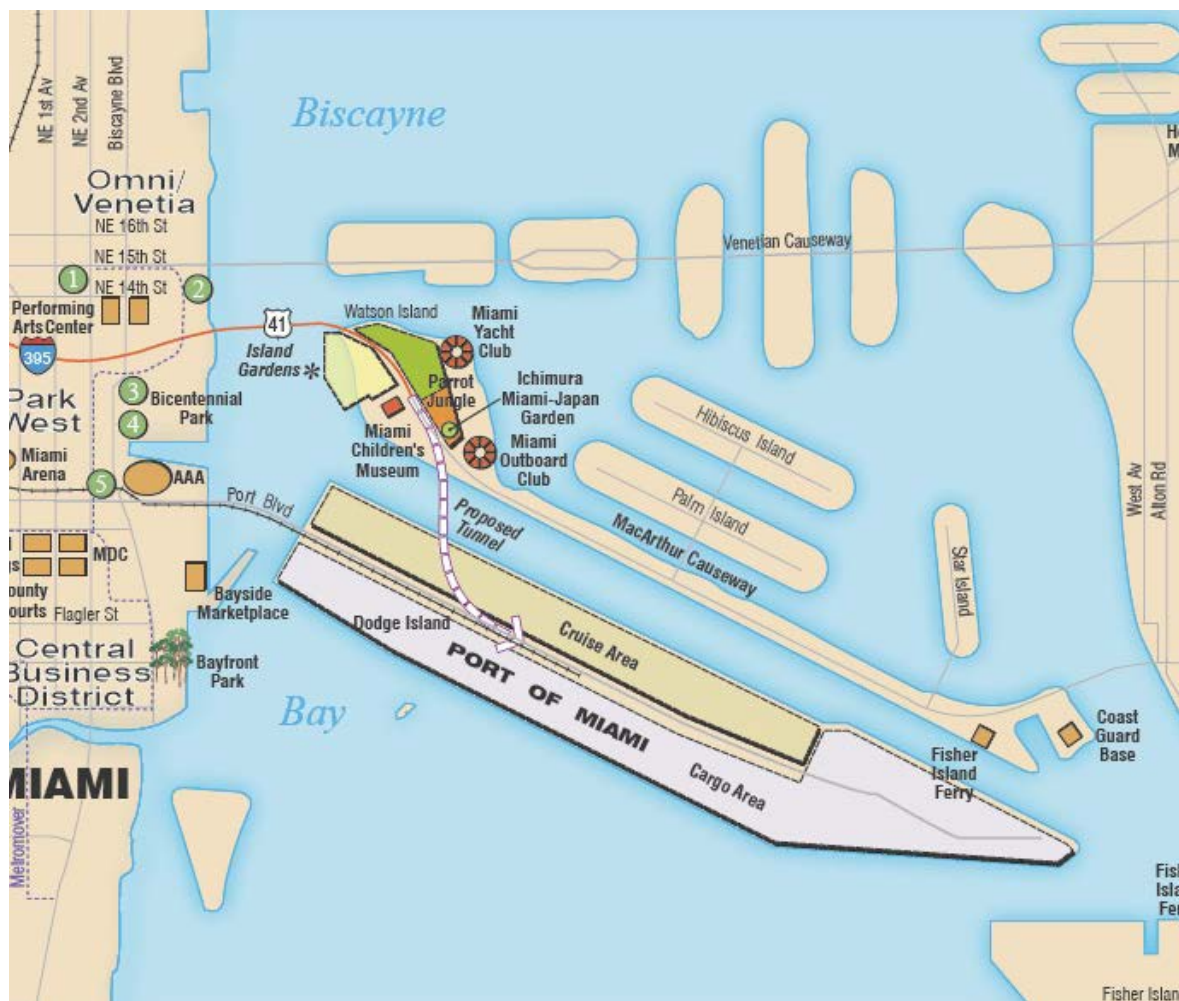
Florida's Seaport Statistics

The following section will provide overviews of the three ports which represent the main gateways for 90% of all container trade into and out of the state. PortMiami, Port Everglades and JAXPort all contribute as conduits in supply chains in servicing markets in Florida. These ports have pursued similar strategies to increase capacity and capture more market share in trade, by increasing depth and improving cargo handling efficiencies to move cargo quicker to rail and truck transportation networks. The disparity in logistical advantages between the ports now becomes more based on location, market size or cargo handling efficiency as well as challenges to increasing utilization in existing supply chains.

4.1 PortMiami

PortMiami is historically the first or second largest port in Florida, along with Port Everglades, in terms of TEUs processed annually. It is the largest cruise terminal in the world which gives cruise ship operations an outsized role at the port. Located in Miami-Dade County, PortMiami is on several islands in Biscayne Bay off of downtown Miami. The main island, Dodge, is connected to the mainland by three bridges and a new tunnel system. The port is approximately 23 miles south of Fort Lauderdale, 71 miles south of West Palm Beach and 263 miles south of Orlando. As Table 12 and 13 below illustrate, Miami and its port operations are the largest in the state.

Map 6: PortMiami Facilities



Source: PortMiami Tunnel, accessed June 17, 2017, www.portofmiamitunnel.com.

Table 12: PortMiami Key Characteristics – 2016

Port Infrastructure	
Acres	520
Number of Employees	21,897 direct jobs
Economic Activity	\$41.4 billion
Channel Depth	50 to 52 feet
Channel Length	2.5 miles
On-Site Warehouse Facilities	2 buildings, 552,500 SF
Open Yard Facilities (Acres)	250
Rail Served	Florida East Coast Railroad
FY2016 Port Volume	
Containers (TEUs)	1,028,156
Total Waterborne Commerce (Tons)	8,777,974
Containers	8,777,974
Bulk/Break Bulk	N/A
Liquid (Petroleum) Products	N/A
Imports	4,749,255
Exports	4,028,719
Domestic	N/A
Cruise Ships Passengers	4,980,490
Capital Improvements (Millions)	
2012-2016	\$1,400.0
2017-2021	\$272.1

Source: PortMiami, Florida Ports Council, Cushman & Wakefield (2Q17 data).

Table 13: Miami-Dade County Demographic and Real Estate Data

Market Data (County)	
Land Area (Acres)	1,315
Population	2,693,790
Hispanic Percent	66.2%
Households	933,087
Median Household Income	\$43,865
2Q17 Real Estate Market (County)	
Warehouse/Distribution (W/D) Inventory (SF)	131,382,278
W/D Direct Vacancy Rate	5.2%
W/D Rental Rate (PSF/NNN)	\$8.24
W/D Under Construction (SF)	1,918,130

Source: 2010 & 2010 Census. Alteryx Inc., 2017. Cushman & Wakefield Research Services.

4.1.1 Port Infrastructure ⁶⁴

PortMiami is a top 20 port for container trade in the U.S. and its cruise ship terminal welcomed 4.8 million passengers in 2016. The channel to Atlantic shipping lanes is relatively short which means ships do not spend significant amounts of time navigating to/from port facilities. Based on acreage, it is the smallest of the three container ports and its 520 acres include a 250-acre cargo storage yard and numerous cruise ship terminals that take up a third of the island, with the balance taken up by warehouse/distribution buildings, cargo handling operations and the on-dock rail line. Unlike Port Everglades and JAXPort, PortMiami is located on a man-made island next to dense

⁶⁴ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan" *Florida Ports Council*. April 2017. P. 65-66.

mixed-use urban areas with no space to expand. The port focuses on maximizing utilization of existing space which means that cargo and cruise ship operations are not completely separate and many times have to share some of the same areas. PortMiami, like the other two ports, is focused on infrastructure improvements that increase the speed and efficiency of moving cargo on/off ships. It has been able to make significant improvements in streamlining and shortening cargo handling times. One notable fact the port is able to market as an advantage is that PortMiami has some of the fastest times for any port on the East Coast (less than 24-hours) in moving perishable cargo, like fruits and vegetables, from ship to refrigerated warehouse/distribution space either in Miami-Dade or throughout the state. The two main reasons for that distinction are the new tunnel connection to the freeway and the short on-dock rail line. Both help with moving certain types of perishable cargo quicker, but are limited in speeding up the movement of other types of cargo at the port. The tunnel to freeway connector must compete with cars to and from the cruise terminals. The rail line at max can handle less than 10% of all containers coming into the port annually. Moreover, the bulk of goods coming through PortMiami are not perishables. In fact, it is not even in the top five of commodities going through the port by tonnage.

PortMiami was the first port to finish dredging to accommodate larger ships. Even before the dredging, the channel in Miami was the deepest out of the three largest ports on the Atlantic. One other reason it might have been first was that it was going to cost the least amount to dredge. There were not bedrock issues in the channel that Port Everglades had nor was the length of the channel long, which is not the case at JAXPort. Another important factor was PortMiami's focus on maintaining its competitive edge in the cruise industry. Container ships were not the only ones increasing in size. Cruise ships were growing longer, taller and wider. While most new cruise ships being developed, even the largest ones on the seas, did not require depths greater than 35 feet, they did require wider channels, increased lengths of berths and larger turning basins that many of the larger container ships needed as well. It is important to note that in my research, I did not come across any specific recommendation in the run up to PortMiami's capital improvement projects that they were expressly undertaken to benefit cruise operations.

PortMiami has completed several major capital improvements since 2009, including:

- *PortMiami Deep Dredge* – Increased the depth of the channel to 50 feet plus, completed in 2015. The 50-foot plus depth still does not allow PortMiami to accept fully laden Post-Panamax ships capable of carrying more than 10,000 TEUs. Fully loaded ships could only use the port and only then at high tide. Estimated cost: \$220 million.
- *Rail Rehabilitation and Intermodal Rail Yard* – Florida East Coast Railway restored on-dock rail in 2014 on a 12-acre site. The yard is able to currently handle about 100,000 containers

annually. That could be increased to 250,000 annually but restrictions on the length and run times for trains would have to be lifted. The rail line connects with intermodal facilities and the regional line farther inland. Estimated cost: \$50 million.

- *New Port Tunnel* – A 4,200 foot underwater tunnel beneath Biscayne Bay was completed in August 2014, and connects the port directly with the interstate system. Nearly 16,000 vehicles traveling use it each weekday with 28% of the total being truck traffic transporting cargo to and from the port. Estimated cost: \$1 billion.
- *Gantry Cranes* - The installation of four new gantry cranes needed for Post-Panamax ships that are equipped to reach across the length of 22 containers and stack them eight units high. Final cost: \$39 million.

List of Major Planned improvements (2017 – 2021)

PortMiami has completed the main projects that position the port to handle larger ships and quickly move cargo through its operations. Over the next five years, as Port Everglades and JAXPort finalize their dredging and improvement plans, PortMiami will focus on creating extra efficiencies to maintain its standing in both cargo and cruise industries. Capital projects include: expansion to existing terminals, new cruise terminals and berths, additional intermodal and parking facilities, ferry terminals, additional cargo laydown area, consolidation of warehouse functions, roadway realignments, modernization of cargo terminals through investment in higher efficiency equipment, bulkhead improvements, infrastructure improvements, and procurement of additional Super Post-Panamax gantry cranes.⁶⁵

Transportation Connections (Intermodal Facilities)

As mentioned above, PortMiami is served by the Florida East Coast regional railroad. The on-dock rail line has two daily departures and connects the port to the Hialeah Rail Yard farther inland. It is able to handle about 100,000 TEUs annually, equivalent to less than 10% of the port's total TEUs. The recently completed port tunnel directly feeds traffic to Interstate 395 which in a short distance connects with Interstate 95 and the Florida Turnpike to the west.

⁶⁵ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. P. 66.

4.1.2 Inbound/Outbound Equilibrium

Table 14: Waterborne Imports, Exports and Domestic Tonnage (By Port) 2016

	Imports	Exports	Domestic	Total
Everglades	8,375,823	3,233,757	13,071,751	24,681,331
Jacksonville	8,905,154	2,666,914	7,445,726	19,017,794
Miami	4,749,255	4,028,719	N/A	8,777,974

Source: Florida Ports Council, Five-year Florida Seaport Mission Plan – 2017-2021.

As Table 14 highlights, PortMiami is unique among large ports in Florida in that it exports roughly the same as it imports. The port has two-way trade in some of heaviest container cargo, including heavy machinery bound for the Caribbean, Central and South America. On an average monthly basis, approximately 85,000 TEUs are processed through the port, with slightly more inbound than outbound. Of the total TEUs processed, roughly 25% come into the port empty as well as leave the port empty. As noted in Table 15 below, part of the inefficiency in container traffic is due to the fact that China is PortMiami's biggest trading import and export partner. Due to demand slowing in China for U.S. imports over the past several years, the U.S. has built a significant trade deficit with China, importing much more of China's manufactured goods than the U.S. has been shipping back to China. Ports with trade imbalances with China saw an increase in the number of empty containers returning back to them. The other factor is that PortMiami's other top 10 export countries by TEUs are all in the Americas. Demand also decreased with the general decline in commodity prices sapping buying power from the region.

Table 15: TEU Country/Trade Partner Summary 2016

OVERALL TEUs			IMPORT COUNTRIES			EXPORT COUNTRIES		
1	China	184,341	1	China	135,721	1	China	48,621
2	Honduras	63,113	2	Honduras	28,135	2	Honduras	34,978
3	Costa Rica	53,981	3	Costa Rica	23,389	3	Panama	31,093
4	Dominican Republic	39,298	4	Guatemala	20,776	4	Costa Rica	30,593
5	Panama	34,157	5	Dominican Republic	17,098	5	Dominican Republic	22,200
6	Guatemala	34,097	6	Italy	14,563	6	Jamaica	16,169
7	El Salvador	22,878	7	Vietnam	12,397	7	Colombia	14,942
8	Colombia	22,033	8	Netherlands	11,956	8	Guatemala	13,321
9	Italy	18,557	9	Germany	11,776	9	El Salvador	13,253
10	Jamaica	17,892	10	Mexico	10,981	10	Nicaragua	8,300

Source: PortMiami, 2016 Statistics, March, 24, 2017.

4.1.3 Landside Warehouse/Distribution Market ⁶⁶

The 552,500 square feet (SF) located at the port has been used for refrigerated and general storage purposes. Miami-Dade developed as a dense market effectively boxed in by the Everglades wetlands to the west and the Atlantic Ocean to the east. The linear development between the two forced residential and commercial uses to continuously vie for the same space. PortMiami's location adjacent to the central business district had a negative impact on the port's ability to expand. Starting in the late 1990s, gentrification took hold in the Omni, Wynwood and the Design District neighborhoods adjacent to the port. These became some of the hottest new retail and residential areas in Miami-Dade. Developers adapted or tore down many underutilized buildings, including many of those that support businesses at the port.

The strength of Miami-Dade's overall warehouse/distribution market also does not help the port or its push to expand operations. The dense market in South Florida and high demand has pushed the cost to operate significantly higher than other markets in the Southeast. Through the second quarter of 2017, the market included 131.4 million SF of space in 2,219 buildings (market statistics are based on buildings over 15,000 SF). This represents 49.0% of all square feet between the three markets covered in the report. The majority of the existing warehouse/distribution market clustered around Miami's International Airport, not near PortMiami. Current market fundamentals in Miami-Dade County trended positive at the end of the second quarter 2017. The overall vacancy rate for warehouse/distribution space, which includes both direct vacancy from landlords and any sublease space from tenants, is incredibly tight at 5.5%. The rate has consistently been under 7.5% since the second quarter of 2014. Overall asking rents closed the quarter at \$8.17 per square foot (PSF), up by 29.7% in the last three years. Leasing activity averaged 4.2 million over the past five years. Last year alone in Miami-Dade 5.8 million SF was leased. Year-to-date activity stood at 3.2 million SF for warehouse/distribution space and is on track for the biggest year for leasing in the last ten years. There was 2.4 million SF of warehouse/distribution space under construction split between speculative and build-to-suit. Three submarkets dominate where warehouse/distribution construction is occurring, Airport West with 684,000 SF, Airport North/Medley at 537,000 SF and in Northwest Dade with 697,000 SF.⁶⁷

The fundamentals in the Airport East/Downtown submarket were similar with the overall vacancy rate at 6.9% which has consistently trended downward for the past five years, falling by 4.7 percentage points. Overall asking rents closed the quarter at \$10.29 PSF, up by 18.3% year-over-year. Leasing activity was strong in 2015 as many of the larger blocks of available space were

⁶⁶ Statistics from Cushman & Wakefield Research Services, 2nd Quarter 2017

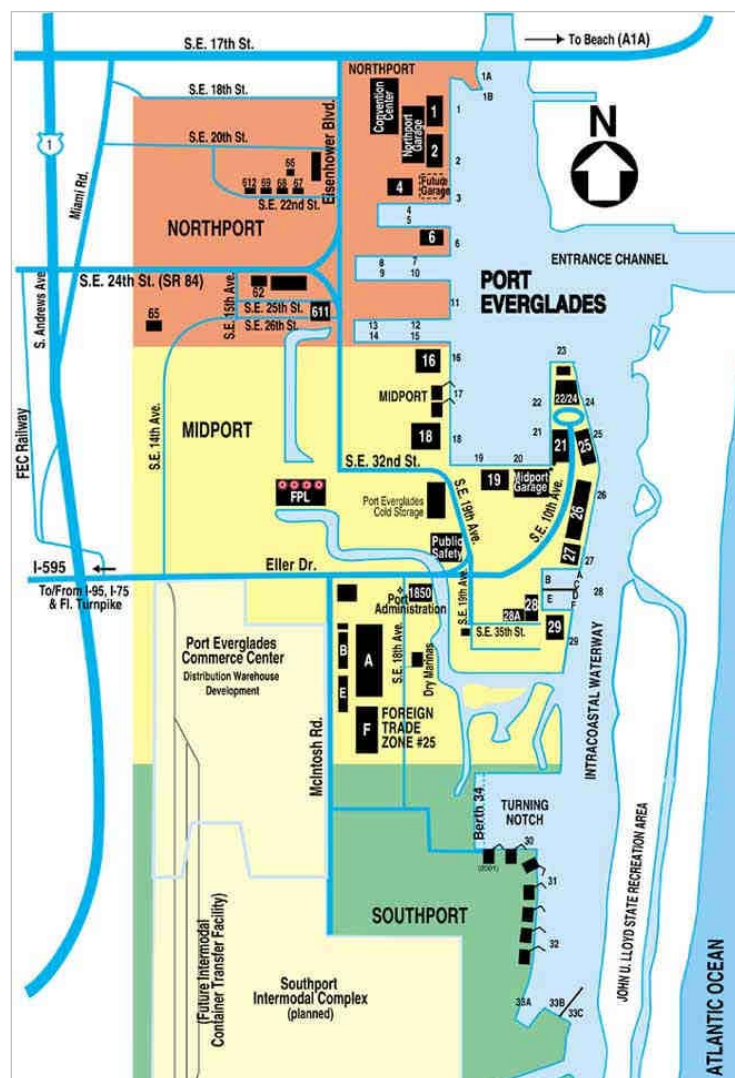
⁶⁷ Statistics from Cushman & Wakefield Research Services, 2nd Quarter 2017.

taken off of the market. Demand in 2016 and year-to-date in 2017 has significantly dropped due to the lack of quality space. There are no projects currently under construction or completed year-to-date. The last speculative project delivered in the fourth quarter of 2014 when 385,000 SF came to market. Most developers have not found sufficient available land for large-scale warehouse/distribution projects near downtown or along the eastern portion of Miami-Dade County. The sites that were available were priced too high or posed some logistical disadvantage for the movement of cargo. From a cost and availability standpoint, construction shifted inland.

4.2 Port Everglades

Located in Broward County, Port Everglades is adjacent to Fort Lauderdale and the Fort Lauderdale International Airport. The port competes with PortMiami annually as the largest port in terms of TEUs processed. Its harbor is manmade, dredged from Lake Mabel in 1927. Initially developed for agricultural and petroleum cargo, the port has grown into one of the largest container ports nationally and is the third busiest cruise terminal in the world. It remains a major petroleum storage and distribution hub and South Florida's primary bulk cargo depot. Port Everglades is 23 miles north of Miami, 48 miles south of West Palm Beach and 215 miles south of Orlando.

Map 7: Port Everglades Facilities



Source: Port Everglades.

Table 16: Port Everglades Key Characteristics – 2016

Port Infrastructure	
Acres	1,742
Number of Employees	12,963 direct jobs
Economic Activity	\$30 billion
Channel Depth	42 Feet
Channel Length	0.5 miles
On-Site Warehouse Facilities (SF)	1.9 million
Open Yard Facilities (Acres)	324
Rail Served	Florida East Coast Railroad
FY2016 Port Volume	
Containers (TEUs)	1,037,226
Total Waterborne Commerce (Tons)	24,681,331
Containers	6,692,800
Bulk/Break Bulk	1,765,540
Liquid (Petroleum) Products	16,223,101
Imports	8,375,823
Exports	3,233,757
Domestic	13,071,751
Cruise Ships Passengers	3,826,415
Capital Improvements (Millions)	
2012-2016	\$53.0
2017-2021	\$766.5

Source: Port Everglades, Florida Ports Council, Cushman & Wakefield (2Q17 data).

Table 17: Broward County Demographic and Real Estate Data

Market Data (County)	
Land Area (Acres)	1,445
Population Density Per County	7,167
Population	1,884,209
Hispanic Percent	28.4%
Households	736,803
Median Household Income	\$52,905
2Q17 Real Estate Market (County)	
Warehouse/Distribution (W/D) Inventory (SF)	60,990,177
W/D Direct Vacancy Rate	4.3%
W/D Rental Rate (PSF/NNN)	\$8.42
W/D Under Construction (SF)	849,607

Source: 2010 & 2010 Census. Alteryx Inc., 2017. Cushman & Wakefield Research Services.

4.2.1 Port Infrastructure

Port Everglades is less than one mile from the main shipping lanes in the Atlantic. It is a major bulk, petroleum and container port with strong international links and a growing dependence on North/South trade with Central and South America. It is also a leading cruise port, accommodating 3.4 million passengers annually, ranking third behind Miami and Port Canaveral.⁶⁸ Unlike PortMiami, there is sufficient land at the port for operations and some expansion purposes. As noted in Table 16 above, the 1,742 acres represent the largest contiguous port complex of Florida three largest container ports. Cargo facilities at Port Everglades include 324 acres of open yard storage, 1.6 million cubic feet of refrigerated storage, 300,000 SF of warehouse/distribution

⁶⁸ Forgiione, Mary. "World's busiest cruise ports are in Florida" Los Angeles Times. July 25, 2017.

space, and 200 petroleum storage tanks. The main selling point for Port Everglades is that it is the main port in South Florida for importing petroleum products including gasoline, jet fuel, and alternative fuels that service the surrounding twelve counties. As noted on Map 7, its facilities are divided into three separate sections: Northport, Midport and Southport. The majority of cruise ship operations and petroleum storage facilities are located in Northport and Midport. Midport traditionally handles most of the container cargo processing with some TEU handling activity shifting to Southport in recent years.

List of Major Planned improvements (2017 – 2021)

- *Southport Turning Notch Extension* – Will increase the length of the existing wharf from 900 to 2,400 feet and provide up to five additional berths and post-Panamax gantry cranes. The estimated cost is \$438 million and should be completed and in operation by 2020.
- *Port Everglades Navigation Improvement Project* – Deepening project to increase depth for the port's Outer Entrance Channel from an existing 45-foot depth to a 55-foot depth and the Inner Entrance Channel and Main Turning Basin from 42 to 48 feet including widening the channels for larger ships. The total estimated cost is \$389 million and the completion date is between 2021 and 2024.
- *New Gantry Cranes* - For a cost of \$41.1 million, Port Everglades will install three new gantry cranes that are equipped to handle super Post-Panamax ships with the ability to reach across the length of 22 containers as well as eight units high.
- *Logistics Center* - The new, state-of-the-art project will be built through a public-private partnership on a prime 16.7-acre site adjacent to the Port's containerized cargo terminals. The new location will have direct access to highways and the Florida East Coast Railway's 43-acre Intermodal Container Transfer Facility. Estimated completion is April 2019.

Transportation Connections (Intermodal Facilities)

Port Everglades is served by the Florida East Coast regional railroad which recently completed in 2014 a \$53 million, 42.5-acre near-dock intermodal container transfer facility (ICTF). The ICTF is adjacent to the port and is able to handle both domestic and international cargo. The ICTF makes it possible for cargo shipped into the port to reach Atlanta and Charlotte in two days, Memphis and Nashville in three days and 70% of the U.S. population in four days. The ICTF is located on port land in the Southport section and when at full capacity will be able to process 450,000 TEUs annually. The seamless transition of cargo from ship to train reduces time and increases reliability.

Interstate 595 connects with Port Everglades and is also known as the Port Everglades Expressway. It goes west from the port, crosses Interstate 95 and the Florida Turnpike, and ties into Interstate 75, which runs across the Everglades and up the west coast of Florida to Atlanta.

4.2.2 Inbound/Outbound Equilibrium

Domestic trade through Florida's ports is a cost effective way to transport goods from one U.S. port to another, either in bulk or in containers, compared to overland via truck or rail. Port Everglades is the number two port for domestic container trade in Florida, at 13.1 million in tonnage (see Table 14 previously), significantly behind the 27.8 million at the Port of Tampa. The bulk of domestic trade through Port Everglades consists of petroleum product, including gasoline, jet fuel and alternative fuels. "Approximately 80% of the petroleum originates from domestic sources, primarily located along the U.S. Gulf Coast."⁶⁹

The overall import/export imbalance for containerized cargo runs roughly over two and a half times greater for imports to exports. Port Everglades does not have a significant amount of two-way trade with China or any other Asian economy. As Table 18 below highlights, the majority of its activity is with Caribbean islands or Central and South America. The weaker state of the economies in those regions means there is less demand for U.S. goods; also the falloff in commodity prices has contributed to a lessening of buyer power from the region. In terms of imported containers, fresh fruit and vegetables as well as apparel items dominate the top ten commodities while vehicle part, machinery, paper pulp and other raw materials are the top ten exports.

⁶⁹ Port Everglades. FY2016 Commerce Report. P. 12.

Table 18: TEU Country/Trade Partner Summary 2016

OVERALL TEUs			IMPORT COUNTRIES			EXPORT COUNTRIES		
1	Honduras	112,044	1	Honduras	65,568	1	Honduras	46,476
2	Guatemala	103,906	2	Guatemala	57,537	2	Guatemala	46,369
3	Dominican	71,491	3	Dominican Republic	26,725	3	Dominican Republic	44,766
4	Bahamas	44,382	4	Brazil	24,861	4	Bahamas	26,517
5	Colombia	33,727	5	Italy	21,617	5	Netherlands Antilles	23,180
6	Brazil	24,861	6	Colombia	19,960	6	Virgin Islands	20,763
7	Chile	23,930	7	Spain	18,721	7	Venezuela	14,922
8	Netherlands Antilles	23,180	8	Bahamas	17,865	8	Trinidad & Tobago	14,631
9	Italy	21,617	9	Chile	9,775	9	Chile	14,155
10	Virgin Island	20,763	10	Portugal	7,053	10	Colombia	13,767

Source: Port Everglades, FY2016 Commerce Report, page 12.

4.2.3 Landside Warehouse/Distribution Market ⁷⁰

Port Everglades' warehouse/distribution market experiences the same density, land constraints and cost issues as PortMiami farther south. Unlike that port, Port Everglades controls more of the immediate land surrounding it, since it is located in a less populated, traditionally industrial swath of the county adjacent to the international airport. Even though it has some room to grow at the port and in the immediate area surrounding the port, Broward County's market fundamentals have the potential to cause concern with users at the port. As noted in Table 17 above, the warehouse/distribution market in Broward County has 61.0 million SF in 1,041 buildings (market statistics are based on buildings over 15,000 SF). This represents 22.6%% of all square feet between the three markets covered in the report. Current market fundamentals trended positive at the end of the second quarter 2017. The overall vacancy rate for warehouse/distribution space, which includes both direct vacancy from landlords and any sublease space from tenants, stood at 4.3%, which was even lower than Miami-Dade. Overall asking rents closed the quarter at \$8.39 PSF, up by 20.9% since the second quarter of 2014. Leasing activity has averaged 2.3 million SF over the past five years. In the past 12-months in Broward County, that number was 2.8 million SF.

In the submarket that included the port, the overall vacancy rate was slightly better, at 5.4%. Overall asking rents closed the quarter at \$8.83 PSF, up by 23.8% since the second quarter of 2014. Leasing activity year-to-date has been limited, like in the rest of the market, by the lack of available space in the submarket. Last year in 2016, the submarket had one of the best years for demand in the last ten years, registering over 312,000 SF in warehouse/distribution leasing activity. In the first six months of 2017, only 45,000 SF of warehouse/distribution space has been signed for by tenants. The port is close to the international airport and has excellent connections to the

⁷⁰ Cushman & Wakefield Research Services, 2nd quarter 2017.

interstate system and Florida Turnpike. The submarket remains minor compared to others in the county. The 3.3 million SF represented less than 6.0% of the total warehouse/distribution market in Broward. Demand for space was not focused on warehouse/distribution product near the port. During the current real estate cycle, most tenants, including retailers, ecommerce firms, and construction-related companies, drove activity to other areas that either had better links to highways or were closer to end customers. Expected increases in capacity at Port Everglades played a limited role in the market's expansion. "There was a big hype on the Panamax ships stopping in South Florida for us to distribute to the rest of the nation. The reality is that it is cheaper to keep cargo on the ship and go up to the East Coast. The stops in South Florida, including Port Everglades, would just be for our market."⁷¹

⁷¹ Metzger, Chris. "Broward Industrial." E-mail message to author. June 27, 2017.

4.3 JAXPort

Located in Duval County, JAXPort is on the St. Johns River in Jacksonville and has the longest channel length of any port in Florida. It is one of the newest ports in the U.S., with the port authority to run it created in 1963 by a special act of the Florida Legislature. JAXPort is unique in that it has three separate port terminals along the St. Johns River (see Map 8 below). The oldest is Talleyrand, which is 21 miles inland from the Atlantic and two miles east of downtown Jacksonville. Blount Island, which is 9 miles inland, is one of the largest vehicle import/export centers in the U.S. and has the largest container processing facility along the river. Dames Point is situated 1 mile upstream from Blount Island and is situated on the other side of the Dames Point Bridge. This restricts access to its berths by some ships that need a certain clearance to make it under the bridge. Dames Point's terminal is also where Jacksonville's small but growing cruise ship operations are located. Table 19 below more clearly defines the differences between the three different marine terminals. JAXPort is exactly midway between Miami and Atlanta, 346 miles from each. It is 141 miles from Orlando and 199 miles from Tampa.

Map 8: JAXPort Facility Locations



Source: Metro Jacksonville. Accessed July 13, 2017. (www.metrojacksonville.com).

Table 19: JAXPort Key Characteristics – 2016

Port Infrastructure	
Acres (Total)	1,512
Number of Employees (Total)	24,000 direct jobs
Economic Activity	\$26.9 billion
Blount Island	
Acres	754
Channel Depth	41 feet
Channel Length	17 miles
On-Site Warehouse Facilities	330,000 SF
Open Yard Facilities (Acres)	250
Rail Served	CSX
Talleyrand	
Acres	173
Channel Depth	38 feet
Channel Length	21 miles
On-Site Warehouse Facilities	553,000 SF
Open Yard Facilities (Acres)	N/A
Rail Served	CSX, Norfolk Southern
Dames Point	
Acres	585
Channel Depth	40 feet
Channel Length	10 miles
On-Site Warehouse Facilities	N/A
Open Yard Facilities (Acres)	158 (TraPac)
Rail Served	CSX
FY2016 Port Volume	
Containers (TEUs)	968,279
Total Waterborne Commerce (Tons)	19,017,794
Containers	4,661,804
Bulk/Break Bulk	9,610,859
Liquid (Petroleum) Products	4,745,131
Imports	8,905,154
Exports	2,666,914
Domestic	7,445,726
Cruise Ships Passengers	197,295
Capital Improvements (Millions)	
2012-2016	\$110.1
2017-2021	\$752.5

Source: JAXPort, Florida Ports Council 2017.

Table 20: Jacksonville Metro Demographic and Real Estate Data

Market Data (Metropolitan Statistical Area "MSA")	
Land Area (Acres)	3,698
Population Density Per MSA	384
Population	1,445,575
Hispanic Percent	8.2%
Households	560,507
Median Household Income	\$53,505
Real Estate Market (Duval, St. Johns and Clay counties)	
Warehouse/Distribution (W/D) Inventory (SF)	76,549,952
W/D Direct Vacancy Rate	6.4%
W/D Rental Rate (PSF/NNN)	\$4.07
W/D Under Construction (SF)	3,343,476

Source: 2010 & 2010 Census. Alteryx Inc., 2017. Cushman & Wakefield Research Services (2Q17 data).

4.3.1 Port Infrastructure

JAXPort's three separate marine terminals have always been defined by the port's 21-mile channel. Talleyrand initially developed adjacent to downtown closer to growing population clusters. The river's many twists and turns made it harder for the larger ships used in trade after the end of World War II to reach Talleyrand. In the 1950s, the Dames Point Cut in the St. Johns River made it easier for most ships to navigate the first ten miles of channel to Blount Island. When the Jacksonville Port Authority was established in 1963, the western portion of the island started to be used for freight operations. The 754-acre Blount Island Marine Terminal has remained the largest container facility of the three terminals and handles approximately 80% of all container traffic. The Dames Point Marine Terminal, a \$230 million, 585-acre project, opened in 2009 and featured two 1,200-foot berths and six New Panamax container cranes.⁷² The largest tenant, TracPac, is an Asian carrier that leases 153 acres for 30 years for a container terminal. In 2016, it only handled about 15% annually of Dames Point's total capacity of 800,000 TEUs. One reason Dames Point was underutilized was due to its location west of the Dames Point Bridge. When it was developed, it was not contemplated that containerships would grow to the size they did or that ports would have to have the capabilities to service them. The expansion of the Panama Canal changed the dynamics and how ports needed to upgrade capabilities. The bridge restricted access by larger ships that require a certain clearance. Dames Point's main tenant, TracPac recently agreed to move their facility to the Blount Island terminal. Even though the move will incur substantial costs, it will allow TracPac to service larger ships as well as decrease dredging costs by \$200 million since the deeper depths would end at Blount Island. It also negated the need to raise the height of the bridge.

Out of the three ports covered in this report, JAXPort has the most room to grow. While the 1,512 in acreage for port operations is less than the largest port, Port Everglades with 1,742 acres, the immediate areas surrounding the terminals are relatively undeveloped. JAXPort's three port terminals are in the Northside submarket of Jacksonville which is traditionally home to a large concentration of warehouse and distribution uses and is sparsely populated compared to other areas. The geographic dispersion of port facilities provides JAXPort with the maximum flexibility in setting up on-dock port and cargo handling operations. The abundance in transportation links to both rail and highway interstate systems in Jacksonville provide carriers with reliable avenues that allow them to service close to 70% of all consumers in the U.S. within three days, one day quicker than ports in South Florida.⁷³

⁷² Dames Point Marine Terminal. (<http://www.jaxport.com/cargo/facilities/dames-point-marine-terminal>). Accessed June 29, 2017.

⁷³ Solomon, Mark B. "DC Velocity." *Transportation Report, Maritime & Port Services*. October 4, 2011.

JAXPort has completed several major capital improvement projects since 2014, including:

- *Mile Point Project* – Completed in 2016, the enhancements will help improve vessel navigation and control the flow of the St. Johns River at Mile Point, which had navigational hazards during low tides. Before this was completed, larger ships were restricted from navigating the area between high tide and low tide. The total cost of the project was \$43.5 million.
- *Intermodal Container Transfer Facility (ICTF)* – Finished in 2016, the ICTF directly transfers containers from ships to trains. The on dock capabilities will tie into CSX's main rail lines and area highways. One inbound and one outbound train travels each day (200 containers). The cost for the project was \$30 million.
- *Gantry Cranes* - For a cost of \$37.6 million, in 2016 JAXPort installed three new gantry cranes that are equipped to handle super Post-Panamax ships with the ability to reach across the length of 22 containers as well as eight units high. Ultimately, JAXPort's long term strategic plan calls for 10 large gantry cranes to be purchased.

List of Major Planned improvements (2017 – 2021)

- *Harbor Deepening* - The 11-mile, \$484 million project will stretch from near the mouth of the St. Johns River to the Blount Island Marine Terminal. Construction is slated to begin in early 2018. Upon completion, Blount Island will be the primary Asian container terminal in Jacksonville.
- *General Berth Enhancements* - A wide-ranging effort is underway at Blount Island and Talleyrand terminals to upgrade wharves, on-dock rail and terminal pavement areas. Total cost: \$100 million over the next five years.

Transportation Connections

Jacksonville is served by two Class 1 freight railroads, ⁷⁴ CSX and Norfolk Southern that together have 43,000 miles of track through 23 states. Both CSX and Norfolk Southern rail lines connect to the Florida East Coast Railways line to South Florida.⁷⁵ The proximity of these lines provide a competitive advantage to JAXPort compared to PortMiami and Port Everglades, and allows cargo from the port to reach two-thirds of all Americans one day faster. There is also a short

⁷⁴ Class 1 railroads are the giant freight railroads that own the majority of tracks in North America. Their lines span the continent, and each day their yards and terminals send forth hundreds of trains carrying goods of all types. CSX is a traditional freight hauler. Norfolk Southern is a large-scale transporter of automotive and industrial products.

⁷⁵ "JAXPort's Rail Connections." JAXPORT Magazine. Summer 2017. P. 12.

10-mile line railroad for bulk cargo at Talleyrand that runs west to an interchange with CSX and Norfolk Southern rail switching station northeast of downtown. JAXPort recently opened, in 2016 an Intermodal Container Transfer Facility (ICTF) at Dames Point Terminal to facilitate the on-dock transfer of cargo to and from ships. The facility serves both the Blount Island and Dames Point Terminals. The on-dock rail connections and ease with which cargo can be transferred to long haul rail or trucking lines improve the efficiency and speed of moving cargo from the port's facilities to end customers in other markets. Moreover, there are two Class A freight rail lines, CSX and Norfolk Southern that together have 43,000 miles of track through 23 states. Both CSX and Norfolk Southern rail lines connect to Florida East Coast Railways line to South Florida.

Each of the three terminals have short access routes to the region's interstate highways. Talleyrand connects to Interstate 95 via the 8th Street Expressway. Blount Island and Dames Point are roughly 1.5 miles to the east of Interstate 295 which connect to the north and south to Interstate 95. Interstate 295 also connects with Interstate 10 across town on the west side. Interstate 75 is a one-hour drive west on Interstate 10 from Jacksonville.

4.3.2 Inbound/Outbound Equilibrium

JAXPort is a top three port for the domestic trade in Florida which serves the Northeast Florida market. Like Port Everglades, carriers use JAXPort for domestic trade because it is considered a cost-effective way to transport goods, either in bulk or in containers, compared to being shipped overland via truck or rail. A large portion of domestic cargo, including petroleum-based products, that goes through JAXPort is inbound and is consumed in North and Central Florida markets. JAXPort does have significant outbound domestic trade in tonnage in terms of timber-based products that are harvested in the region.

As noted in Table 14 previously, if the focus is on import/export container trade, the imbalance is skewed with 75% of the tonnage from imports and the rest exports. JAXPort is a more diversified port compared to PortMiami and Port Everglades. The number of trading partners that use the port are more established economies in Europe and Asia. Its top two-way trading partners are Japan and China. JAXPort is also the number one vehicle handling port in the U.S., with almost 650,000 cars annually, including many assembled cars from Japan and Mexico. The large number of car imports contribute to a portion of the import/export trade imbalance at the port. The value in motor vehicles processed through the port is over four to one in terms of imports compared to exports (\$4.5 billion versus \$1.1 billion). In addition, a difference between JAXPort and other Florida ports is that most of the top ten trading partners are from Europe, Asia and the Middle East. Only Mexico and Argentina are in the Western Hemisphere.

4.3.3 Landside Warehouse/Distribution Market ⁷⁶

The Jacksonville market has always been a hub for logistics firms that wanted to serve other markets in Florida. It also captures a significant portion of the container trade from ports out-of-state and that are shipped overland. Its rail and interstate connections have always been more of a draw than activities at the port. As noted in Table 20 above, the overall warehouse/distribution market in Jacksonville (including Duval, St. Johns and Clay counties) has 76.5 million SF in 1,005 buildings (market statistics only covers buildings over 15,000 SF). This represents 26.4% of all square feet between the three markets covered in the report. All three of JAXPort's marine terminals were in the Northside submarket which has 16 million SF of warehouse/distribution space in 96 buildings. The sparsely populated Northside attracted many large warehouse/distribution users, including retail distribution hubs, third party logistics companies (3PLs) and, more recently, ecommerce firms like Amazon.

What stands out for Jacksonville's warehouse/distribution market is how the current market fundamentals stacks up against other markets, particularly those in South Florida. While they trended positive at the end of the second quarter 2017, the overall vacancy rate stood at 6.6% and overall asking rents closed the quarter at \$4.30 PSF. Vacancy levels have historically always been higher while rent levels have consistently been significantly lower in Jacksonville compared to South Florida markets. This was, and remains due, to the abundance of developable land and the intense competition from other markets. Jacksonville's consumer base is not large enough that tenants have to be located there and new construction is aligned with demand to minimize occupancy gains and rent appreciation.

Rent levels in the Northside submarket mirrored those of the Jacksonville market. Overall rents closed the second quarter at \$4.15 PSF, up a modest 8.9% in five years or just 1.8% annually. Rent levels on the Northside could potentially be on an upswing as leasing activity exploded over the last three years. The 1.24 million SF of activity for the first six months of 2017 was actually more than the full-year 1.16 million SF that occurred in 2016. The momentum was based on increased interest by tenants in the Northside, drawn by the recent announcements in 2015 and in 2016 of two large distribution centers by Amazon. Amazon chose Jacksonville as its second major hub in Florida because of its excellent linkages to other markets in Florida and throughout the Southeast. Amazon's announcement validated Jacksonville strategic strength in logistic supply chains.

There has been limited new construction on the Northside in the last five years that was tied to increased trade at JAXPort. Since 2007, only three projects have been constructed over 200,000 SF in the Northside submarket. The Majestic International Tradeport building was located near the airport in a business park used as a major distribution hubs by several international

⁷⁶ Cushman & Wakefield Research Services, 2nd quarter 2017.

retailers. The other two were built near JAXPort's Blount Island Terminal. Built in 2008, 2969 Faye Road is an 815,203 SF warehouse/distribution build-to-suit for Sears. The other project, Northport Logistics Center, was an 872,627 SF warehouse/distribution center that was built in conjunction with the new marine terminal at JAXPort's Dames Point. Since its completion in 2009, it has struggled to find tenants and only had 190,000 SF occupied for a three-year short-term lease. In fact, most cargo coming through the port, including TEUs, does not even stay in Jacksonville. Most containers ended up passing through to other markets in Florida or the Southeast. Additionally, some cargo, including the vast majority of automobiles, did not require warehouse/distribution space for storage. JAXPort was not a major port for perishables and does not have significant refrigerated space portside.

5.0 Comparison Analysis

Florida's main container ports, PortMiami, Port Everglades and JAXPort, have all embarked on extensive water and land enhancements to improve capacity. Factors behind these investments are the state's desire to capture more container trade through its ports and improve its standing in supply chains. The three ports above represent 90% of all container traffic through the state, including both international and domestic trade. Each port has clear advantages and challenges based on the ability to process cargo, serve consumers in local markets and handle larger ships. In comparing the three ports side by side, there are clear indications concerning which port is best equipped to benefit from the costly capital improvements.

5.1 Port Infrastructure

Within the next few years, all three ports analyzed in this report will be finished with major capital projects that will increase their ability to handle larger containerships and process higher loads of cargo. PortMiami is finished with the majority of its enhancements. Port Everglades and JAXPort are just starting the bulk of their upgrades. Once improvements at all three ports are complete, they will be able to handle roughly the same size of ships. In addition, each port is improving the efficiency of cargo handling and moving goods onto transportation networks to end customers. All have on-dock or near dock rail lines and easy connections to interstate highway systems. The differentiating factors between the ports will be in their ability to store increased cargo loads and the speed at which each can deliver cargo to end customers.

Table 21: Florida Port Infrastructure Comparison

Port Infrastructure	JAXPort	Port Everglades	PortMiami
Acres (Total)	2,270	1,742	520
Number of Employees (Total)	24,000 direct jobs	12,963 direct jobs	21,897 direct jobs
Economic Activity	\$26.9 billion	\$30 billion	\$41.4 billion
Channel Depth	38 to 41	42 Feet	50 to 52 feet
Channel Length	21 miles	0.5 miles	2.5 miles
On-Site Warehouse Facilities	883,000 SF	1.9 million	2 buildings, 552,500 SF
Open Yard Facilities (Acres)	408	324	250
Rail Served	CSX, Norfolk Southern	Florida East Coast	Florida East Coast

Source: "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan," *Florida Ports Council*, April 2017.

PortMiami has the deepest depth and second shortest channel length for ships out of the three ports. The on-dock rail and new tunnel makes the transfer speed from ship to shore or vice versa as fast, or faster, than the other two ports. The argument could be made that these

incremental advantages do not give PortMiami a competitive edge over the other ports with respect to infrastructure. The biggest issues with PortMiami are its size and location. It sits on an island off of downtown Miami and there are limited possibilities to expand cargo operations at the port. Any expansion would compete with high value cruise ship operations. Improvements in cargo handling and efficiencies to speed the movement of goods to regional transportation networks will be unable to expand significantly if PortMiami increases the number of TEUs coming through the port. The on-dock rail line has potential to handle 225,000 TEUs annually but can only move about 100,000 TEUs a year now, less than 10% of the total containers currently processed at the port last year. If the number of TEUs increases to 1.5 million annually, the rail line can still only handle 100,000 TEUs a year based on current restrictions. Changes in regulations on length and when trains can run on mainland tracks have to happen before rail capacity could be increased. The new tunnel makes PortMiami the only U.S. port with direct, non-stop access to an interstate highway system. While this helps to speed the movement of cargo through the port there are variables that mitigate its effectiveness. For every TEU that cannot leave the port via rail, it must be trucked. Even if the distance is minimal from the port to inland intermodal facilities, there is still the added capacity on area highways that are already dealing with congestion issues. The improvements and efficiency upgrades end for the most part at the port's boundary. The bottlenecks imposed in accessing regional transportation networks creates a disincentive for carriers to use PortMiami if more established supply chains can offer more reliability and speed.

Port Everglades will have a channel depth to 48 feet by 2022. Unlike PortMiami, Port Everglades has a much larger footprint and some ability to modify port facilities to meet the changing needs of the shipping industry. It also has significant cruise ship operations, making it the third busiest cruise port in the world in 2016 with 3.7 million passengers.⁷⁷ Container traffic represents about a quarter of all cargo that goes through the port with most being petroleum-based products which require on-dock storage containers and massive requirements for trucking distribution.⁷⁸ To accommodate growth in containers, some of the existing infrastructure could be shifted to sites farther inland, thereby facilitating the movement of goods either by truck or, in the case of liquid cargo, pipeline. Port Everglades' one clear advantage over PortMiami is the intermodal facility located directly adjacent to the port that has the ability to process 450,000 TEUs a year. The intermodal facility ties directly to Florida East Coast Railway's regional rail line which allow more containers from Port Everglades to reliably reach more consumers in the same amount of time as from PortMiami.

JAXPort's three marine terminals provide unique logistical advantages that the other two

⁷⁷ Port Everglades. FY2016 Commerce Report. P. 4.

⁷⁸ "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017. P. 48-49.

ports do not possess. Operations can be split between separate terminals and each terminal can be specialized in the types of cargo handled. The terminals all have the ability to expand. Talleyrand, being the shallowest and farthest inland, processes more bulk and break-bulk cargo while Dames Point focuses more on containers and cruise ship operations. Blount Island, being the closest to Atlantic trade lanes, is able to handle the largest ships coming to Jacksonville and handles container, bulk and break-bulk cargo. The obvious challenge for JAXPort is the length of the channel. The 21-mile length represents the longest channel for any port in Florida and the movement by larger ships is restricted in the upstream reaches by navigation and clearance issues. To dredge the full length of the channel would be cost prohibitive and unnecessary since Talleyrand is not used as a container port and does not need to greater depths. Dames Point and Blount Island terminals handle container traffic. The issue with the Dames Point Terminal is that it is on the wrong side of the Dames Point Bridge which impedes taller ships, including Post-Panamax ones. Recent developments to create a cost-effective solution to deepen the channel included the agreement in the summer of 2017 for Dames Point's largest tenant for container trade to move its facilities to Blount Island Terminal. This will have the potential to save hundreds of millions of dollars in dredging costs and allow the port to move forward quicker on digging the channel to 47 feet. Once dredging is complete, JAXPort will use the Blount Island Terminal as its main container terminal with smaller containerships still able to utilize Dames Point. This flexibility and specialization from the three separate terminals is one infrastructure competitive advantage that PortMiami and Port Everglades cannot hope to match.

JAXPort also benefits from its location at the top of Florida. It is half a day closer to markets in the Southeast and eastern region than PortMiami and Port Everglades. There are better interstate connections in Jacksonville with Interstates 95, 295 and 10 all connecting in the market. Moreover, the on-dock rail from all three terminals helps to move approximately 150,000 TEUs annually from Dames Point and Blount Island terminals. These tie into CSX and Norfolk freight rail lines with connections to 23 states. There is also potential to ramp up rail capacity from the terminals in the future. While not as significant as the number of TEUs that the rail line at Port Everglades can handle directly from the port, the terminals in JAXPort do not have the same highway congestion issues as South Florida and are close to out-of-state markets.

Each port has, or will be, increasing capacity and improving cargo handling efficiency. PortMiami and, to a lesser extent, Port Everglades will be limited in expanding facilities to meet future increases in container traffic. From a logistics standpoint, the location of PortMiami and Port Everglades at the end of a peninsula hampers its ability to service more than just the local regional market. There is only one rail line and congested freeway access to the rest of the state and beyond. JAXPort's position in the northeast corner of the state provides it with stronger connections

to other markets and allows it to play a more prominent part in supply chains. It has the added benefit that its location makes it easier to move cargo because Northeast Florida does not have the density or same levels of traffic issues. JAXPort also has on or near-dock storage and processing capabilities to act as a transshipment hub for cargo using the Panama Canal. It is able to offer delivery that is a half day quicker than the ports in South Florida and comparable with its closest competitor, Savannah.

“Container Cargo must be able to move efficiently across land to and from ports since most businesses and consumers that are selling and buying goods are located outside the port area. The continued efficiencies for global trade gained by the use of containers in shipping are dependent upon an inland transportation network that allows for the timely and efficient overland transfer and transport of cargo.”⁷⁹ Out of the three deep-water container ports in Florida on the Atlantic, JAXPort has the flexibility and capacity in its infrastructure to provide the maximum numbers of options for carriers to move cargo quickly and efficiently through its terminals to end markets. It has the ability to grow and adapt to changing industry trends more so than Port Everglades or PortMiami can in their present locations.

⁷⁹ “About the Industry.” World Shipping Council. Accessed June 3, 2017. (<http://www.worldshipping.org/about-the-industry/how-liner-shipping-works>).

5.2 Inbound/Outbound Equilibrium

Table 22: FY2016 Port Volume

FY2016 Port Volume	JAXPort	Port Everglades	PortMiami
Containers (TEUs)	968,279	1,037,226	1,028,156
Total Waterborne (Tons)	19,017,794	24,681,331	8,777,974
Containers	4,661,804	6,692,800	8,777,974
Bulk/Break Bulk	9,610,859	1,765,540	N/A
Liquid (Petroleum) Products	4,745,131	16,223,101	N/A
Total Tonnage	19,017,794	24,681,331	8,777,974
Imports	8,905,154	8,375,823	4,749,255
Exports	2,666,914	3,233,757	4,028,719
Domestic	7,445,726	13,071,751	N/A
Cruise Ships Passengers	197,295	3,826,415	4,980,490

Source: "Florida's Seaports – A Global Threshold 2017-2021, Five-Year Florida Seaport Mission Plan." *Florida Ports Council*. April 2017.

Container traffic to Florida is seven million TEUs annually with 3.5 million coming via waterborne trade and the other half overland on trucks or rail. Roughly 40% of the TEUs that come into the state full leave empty.⁸⁰ That imbalance is created because Florida does not produce enough raw materials or manufactured goods that other U.S. or international markets want compared to what the state consumes. Each port serves the needs of different supply lines in the import and export trade. What is imported or exported out of one port is substantially different than the others. Even though Florida is a major consumer market, international supply chains have not traditionally utilized Florida ports as transshipment hubs or as first or last ports of call in trade routes. Domestic cargo plays an outsized role in two out of the three largest container ports in Florida. Roughly 40% of all tonnage that comes through the JAXPort is domestic in origin, and 53% at Port Everglades. PortMiami has no domestic cargo. For the most part, domestic trade into JAXPort and Port Everglades is inbound with limited opportunity for outbound trade even with capital improvements at the ports. The reason is that a large portion of the domestic imbalance at both ports, along with the Port of Tampa, is because it supplies petroleum-based products for their immediate regions. Florida does not have or produce anything that can counterbalance oil imports. In addition, domestic cargo is a low cost alternative for carriers to ship goods from other markets by sea instead of overland. Waterborne domestic cargo does not include the 3.5 million of international sourced TEUs that travel to the state overland from other markets.

The state of Florida can improve its standing in supply chains by being a lower cost option than competing ports and creating a reliable distribution network that speeds the movement of

⁸⁰ "State of Florida's Seaports 2015, Competitive Committed Connected." *Florida Ports Council*. Prepared February 2015. Coastal Communications and Public Relations, Inc.

cargo to customers. Florida is already in the process of creating a cost-efficient infrastructure that allows it to compete directly with other markets on price and the speed-of-delivery. The best port to focus on capturing more of the domestic container cargo that comes to the state through other East Coast ports is JAXPort. "Supply chains in 21st century are no longer port-to-port so the effectiveness of international supply chains is linked to the efficiency inland dispersal of international cargo that arrived in a country by sea,"⁸¹ as well as domestic cargo from other U.S. markets.

With planned capital improvements at JAXPort and Port Everglades over the next five years combined with each port's superior transportation links will create clear logistical advantages. No matter how much investment PortMiami uses to expand their capabilities, it cannot compete with the volume allowed at the others. South Florida may have the larger consumer market than Jacksonville but JAXPort is still a half day closer to out-of-state markets and possesses better transportation links to service more consumers regionally. Due to its smaller size, JAXPort also has better positioned to capture additional market share from out-of-state ports since it is less congested and is more adaptable to shifting supply chains. Savannah, which is situated just 140 miles north of Jacksonville, could see some business transfer to JAXPort if, and when, any issues prevent carriers to dock.

⁸¹ "About the Industry." World Shipping Council. Accessed June 3, 2017. (<http://www.worldshipping.org/about-the-industry/how-liner-shipping-works>).

5.3 Landside Warehouse/Distribution Market

Table 23: Warehouse/Distribution Overall Market Statistics

	No. Bldgs.	Inventory	Overall Vacancy Rate	Direct Triple Net Rents	YTD Leasing Activity	YTD Construction Completions	Under Construction
Miami/Dade	2,219	131,382,278	5.5%	\$8.30	3,209,127	2,049,276	1,918,130
Airport							
East/Downtown	491	21,079,984	6.9%	\$10.29	173,544	0	0
Broward County	1,041	60,990,177	4.6%	\$8.39	1,187,868	289,137	999,254
Ft. Lauderdale –							
Airport/Dania	133	3,497,509	5.4%	\$8.83	45,034	0	306,466
Jacksonville	1,005	76,549,952	6.6%	\$4.07	2,272,414	0	3,343,476
Northside	96	16,005,483	14.9%	\$4.30	1,238,999	0	1,520,000

Source: Cushman & Wakefield Research Services (2Q17 data). Statistics only include buildings 15,000 SF or greater.

There are two areas that differentiate the warehouse/distribution markets between South Florida and around Jacksonville. At the end of the second quarter 2017 (highlighted in Table 23 above), rent levels are almost double in Miami-Dade and Broward counties for warehouse/distribution space compared to similar product in Northeast Florida. Average overall rents in Miami-Dade are \$8.17 PSF, \$8.39 PSF in Broward County, and fall dramatically in Jacksonville to \$4.30 PSF. Part of the reason has to do with the dense nature of the South Florida market where industrial uses compete with residential or other commercial uses for the same land parcels. Jacksonville has an abundance of vacant land with less restrictions on what can be built. Land prices remained relatively cheap, compared to South Florida markets, which is one factor why overall rent levels in the market are lower. In fact, warehouse/distribution rents in Jacksonville are comparable or less than rents in other markets with ports in the Southeast. The port of Savannah's average asking rents are \$4.32 PSF, Charleston with \$5.48 PSF and Norfolk at \$4.86 PSF.⁸²

The breakdown for statistics in the submarkets where ports are located was even more pronounced. The overall rents in South Florida for Miami-Dade were at \$10.29 PSF with the numbers in the area around the port in Broward County at \$8.83 PSF, a premium of 25.9% and 5.2%, respectively, above their overall markets. Average overall rents in the Northside submarket in Jacksonville were the opposite, minus 3.5% of overall rents in the market. Rent levels alone could have the potential to make JAXPort more attractive to international carriers that look for the most cost effective and efficient market to use for supply chains.

⁸² Cushman & Wakefield Research Services (2Q17 data).

The second area that impacts the warehouse/distribution markets between South Florida and Jacksonville is the ability of tenants to find space to expand. The submarkets around the ports in South Florida are historically where warehouse/distribution space was initially built. The majority of facilities in these submarkets are predominantly older and have smaller footprints than what many logistic companies need today. For PortMiami and Port Everglades, the submarkets closest to ports provide limited options for tenants that wish to expand. They also do not provide any incentive to carriers to shift operations to those ports since the limited options are coupled also with higher rental costs. In addition, both Port Miami and Port Everglades have extensive cruise ship operations that have dominated placement at the docks and which require continued investment to stay competitive. JAXPort does not have these issues. The three separate marine terminals along the St. Johns River provide maximum flexibility in the types/sizes of ships that can call on Jacksonville. The Northside submarket has greater potential for expansion purposes for warehouse/distribution space. Rental costs are less than half of those in South Florida and are more aligned with major competing out-of-state ports.

6.0 Conclusion

Both market conditions for port-related industrial and logistics real estate and trade flows should be determining factors when deciding on capital improvements to increase cargo capabilities. The location of the port, its ability to expand and the ease with which it can move cargo through the port to inland transportation systems are critical to operations. However, real estate is not the only perspective that should be used. The greater story for Florida's ports and with the growth of trade is how the state fits into overall supply chains. Even as the state's population exploded, Florida's three main container ports played a role in supplying the state's growing consumer market with goods but continued to lose out to competing out-of-state ports. As the shipping industry shifted to larger vessels, together with the expansion of the Panama Canal, Florida's three largest container ports saw an opportunity to expand their capabilities. This could enable the ports to capture more trade from other ports and generate positive economic impact for local markets. The "build it and they will come" mentality that the increases in capacity will be followed by increased usage is the same strategy that other competing ports along the East Coast followed as well. JAXPort has the ability to expand its operations, handle the increases in cargo capacity and move goods quicker to end markets better than South Florida ports.

For South Florida, the expected outcomes to the money invested at the ports for increasing cargo capabilities remain unanswered. Any increases in cargo traffic at the two ports will be predominantly inbound. Cargo, once it is taken off a ship either has to be stored at the dock or transported inland. PortMiami has restricted ability to store cargo portside and cannot move large numbers of TEUs inland efficiently. The on-dock rail can only move 100,000 units annually. That leaves almost a million TEUs that have to be trucked. Port Everglades has better storage on-dock means and a rail system with the capacity to move 450,000 TEUs annually. If the number of TEUs processed increases by 15% over the next five years, that is still going leave 750,000 million TEUs that have to be trucked in some way on congested and overloaded roads. One conclusion is that the infrastructure improvements are not necessarily geared towards substantially increasing cargo capabilities but to maintain current standing in supply chains. This is further highlighted by both PortMiami's and Port Everglades' substantial cruise ship operations. While cruise ships do not need the depths of containerships, the largest cruise ships do require many of the upgrades to channels and dock side improvements that benefit containerships. It is of vital importance to the ports and the local jobs they support to maintain and secure dominance in the cruise industry. For both PortMiami and Port Everglades, cruise ship operations directly compete for space at each port with those for cruises taking precedence over cargo.

JAXPort is the logically ideal port in Florida for investment to increase capacity. JAXPort's flexibility in container port facilities, location at the northern end of the state closer to other regional markets and superior transportation links sets it above both PortMiami and Port Everglades. Growth at the two South Florida ports proved to be limited by the defined size of their facilities and the dense nature of their markets. In addition, from a cost basis, the price of land for development and asking rents can be up to 100% higher than comparable land and space adjacent to JAXPort. Based on real estate factors alone, JAXPort is the superior container port in Florida and is deserving of capacity enhancements.

For trade, JAXPort has a more diversified port complex able to handle all types of cargo and is better located near major distribution clusters on the East Coast. That locational advantage provides it with a half to full day head start on deliveries destined for points beyond Florida compared to South Florida ports. There are opportunities to grow inland storage facilities adjacent to each of the three marine terminals. The highway system connects two major interstates and the two class 1 rail lines have the ability to move cargo quickly to 23 states on the eastern seaboard. Cargo is king at JAXPort with the number of passengers on cruises from Jacksonville a fraction of South Florida ports.

JAXPort does have the ability to capture some trade that currently uses out-of-state competing ports. The logistical similarities between it and its closest competitor in transit times and markets served create opportunities to shift some supply chains through JAXPort, especially if there are additional cost savings or cargo handling efficiencies. The cost savings could come from lower port fees and shorter wait times for ships to dock. These create incentives for carriers to modify supply chains.

Florida's unique position with the closest ports to the Panama Canal and along the growing North/South trade lanes in the Americas provide it with a strong rationale to upgrade port operations. It does not make sense to pursue this strategy at every port in Florida since there are other factors that could hamper growth. Carriers set up supply chains that maximize speed at the lowest cost. Each of Florida's three largest container ports play a role in existing supply chains for some types of cargo. Out of the three, JAXPort has the best chance of being used as a port of call for more cargo that is now going to competing ports. It has the room to adapt, grow and handle not only increases in container cargo, but all types of cargo.

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